



OM-947

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February 2003

### Processes



Flux Cored (FCAW) Welding



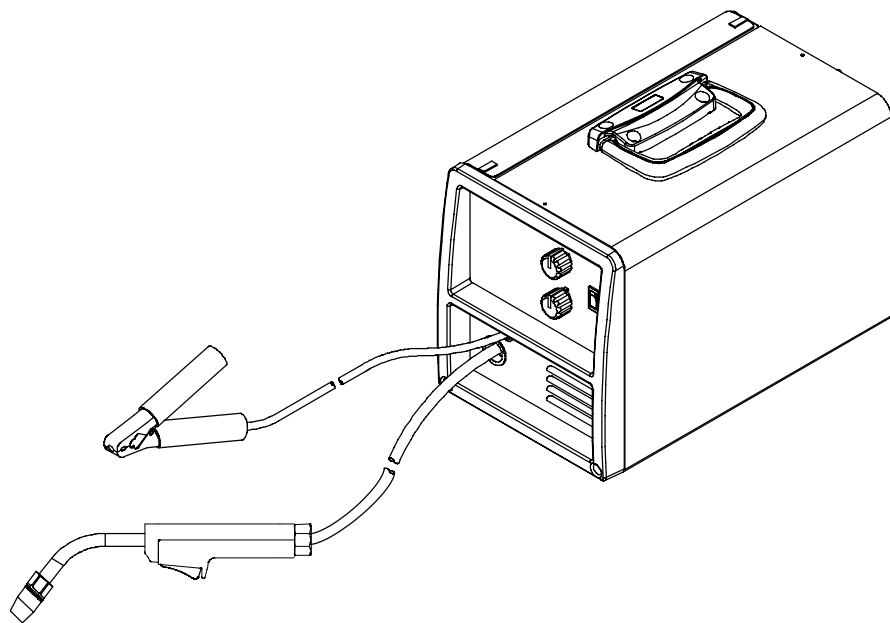
MIG (GMAW) Welding (Optional)

### Description



Arc Welding Power Source And  
Wire Feeder

# Handler 125 / 125 MIG And H-9 Gun



## OWNER'S MANUAL

# From Hobart to You

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*Thank you and congratulations* on choosing Hobart. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

This Owner's Manual is designed to help you get the most out of your Hobart products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite.



Hobart is registered to the ISO 9001:2000 Quality System Standard.

We've made installation and operation quick and easy. With Hobart you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide the exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.



Hobart Welders manufactures a full line of welders and welding related equipment.

For information on other quality Hobart products, contact your local Hobart distributor to receive the latest full line catalog or individual catalog sheets.

**To locate your nearest distributor or service agency call 1-877-Hobart1.**

## 5/3/1 WARRANTY

Working as hard as you do – every power source from Hobart is backed by the best warranty in the business.

*Hobart offers a Technical Manual which provides more detailed service and parts information for your unit. To obtain a Technical Manual, contact your local distributor. Your distributor can also supply you with Welding Process Manuals such as SMAW, GTAW, GMAW, and GMAW-P.*

**HOBART®**  
WELDING PRODUCTS

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## WARNING

This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

The following terms are used interchangeably throughout this manual:  
MIG=GMAW

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# SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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## 1-1. Symbol Usage



Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ Marks a special safety message.

☞ Means "Note"; not safety related.



This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

## 1-2. Arc Welding Hazards

▲ The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-4. Read and follow all Safety Standards.

▲ Only qualified persons should install, operate, maintain, and repair this unit.

▲ During operation, keep everybody, especially children, away.



### ELECTRIC SHOCK can kill.

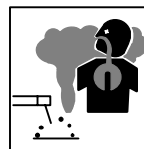
Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.

- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

### SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.



### FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.



### **ARC RAYS can burn eyes and skin.**

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

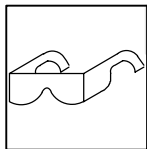
- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.



### **WELDING can cause fire or explosion.**

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.



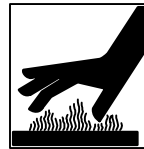
### **FLYING METAL can injure eyes.**

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.



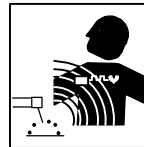
### **BUILDUP OF GAS can injure or kill.**

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.



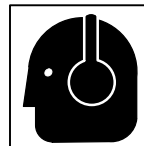
### **HOT PARTS can cause severe burns.**

- Do not touch hot parts bare handed.
- Allow cooling period before working on gun or torch.



### **MAGNETIC FIELDS can affect pacemakers.**

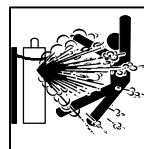
- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.



### **NOISE can damage hearing.**

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.



### **CYLINDERS can explode if damaged.**

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

## 1-3. Additional Symbols For Installation, Operation, And Maintenance



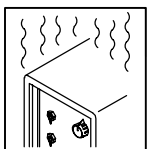
### FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.



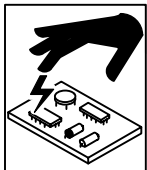
### FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



### OVERUSE can cause OVERHEATING

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



### STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.



### MOVING PARTS can cause injury.

- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.



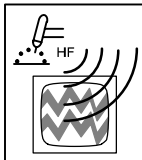
### WELDING WIRE can cause injury.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.



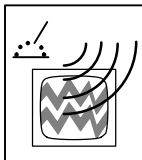
### MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.



### H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



### ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

## 1-4. Principal Safety Standards

*Safety in Welding and Cutting*, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

*Safety and Health Standards*, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

*Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances*, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

*National Electrical Code*, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

*Code for Safety in Welding and Cutting*, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

*Safe Practices For Occupation And Educational Eye And Face Protection*, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

*Cutting And Welding Processes*, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

## 1-5. EMF Information

### Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: "The body of evidence, in the committee's judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard." However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

#### **About Pacemakers:**

Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.



# SECTION 1 – CONSIGNES DE SECURITE – LIRE AVANT UTILISATION

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## 1-1. Signification des symboles



Signifie Mise en garde ! Soyez vigilant ! Cette procédure présente des risques de danger ! Ceux-ci sont identifiés par des symboles adjacents aux directives.

▲ Identifie un message de sécurité particulier.

☞ Signifie NOTA ; n'est pas relatif à la sécurité.



Ce groupe de symboles signifie Mise en garde ! Soyez vigilant ! Il y a des risques de danger reliés aux CHOCS ÉLECTRIQUES, aux PIÈCES EN MOUVEMENT et aux PIÈCES CHAUDES. Reportez-vous aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout danger.

## 1-2. Dangers relatifs au soudage à l'arc

▲ Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous voyez un symbole, soyez vigilant et suivez les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les normes de sécurité énumérées à la section 1-4. Veuillez lire et respecter toutes ces normes de sécurité.

▲ L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.

▲ Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.



### UN CHOC ÉLECTRIQUE peut tuer.

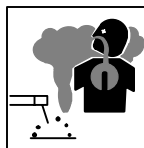
Un simple contact avec des pièces électriques peut provoquer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension dès que l'appareil est sur ON. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension à ce moment-là. En soudage semi-automatique ou automatique, le fil, le dévidoir, le logement des galets d'entraînement et les pièces métalliques en contact avec le fil de soudage sont sous tension. Des matériels mal installés ou mal mis à la terre présentent un danger.

- Ne jamais toucher les pièces électriques sous tension.
- Porter des gants et des vêtements de protection secs ne comportant pas de trous.
- S'isoler de la pièce et de la terre au moyen de tapis ou d'autres moyens isolants suffisamment grands pour empêcher le contact physique éventuel avec la pièce ou la terre.
- Ne pas se servir de source électrique à courant électrique dans les zones humides, dans les endroits confinés ou là où on risque de tomber.
- Se servir d'une source électrique à courant électrique UNIQUEMENT si le procédé de soudage le demande.
- Si l'utilisation d'une source électrique à courant électrique s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Déverrouiller l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir normes de sécurité).
- Installer et mettre à la terre correctement cet appareil conformément à son manuel d'utilisation et aux codes nationaux, provinciaux et municipaux.
- Toujours vérifier la terre du cordon d'alimentation – Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d'entrée fixer d'abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Vérifier fréquemment le cordon d'alimentation pour voir s'il n'est pas endommagé ou dénudé – remplacer le cordon immédiatement s'il est endommagé – un câble dénudé peut provoquer une électrocution.
- Mettre l'appareil hors tension quand on ne l'utilise pas.
- Ne pas utiliser des câbles usés, endommagés, de grosseur insuffisante ou mal épissés.
- Ne pas enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode provenant d'une autre machine.

- N'utiliser qu'un matériel en bon état. Réparer ou remplacer sur-le-champ les pièces endommagées. Entretenir l'appareil conformément à ce manuel.
- Porter un harnais de sécurité quand on travaille en hauteur.
- Maintenir solidement en place tous les panneaux et capots.
- Fixer le câble de retour de façon à obtenir un bon contact métal-métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.

## Il y a DU COURANT CONTINU IMPORTANT dans les convertisseurs après la suppression de l'alimentation électrique.

- Arrêter les convertisseurs, débrancher le courant électrique, et décharger les condensateurs d'alimentation selon les instructions indiquées dans la partie entretien avant de toucher les pièces.



### LES FUMÉES ET LES GAZ peuvent être dangereux.

Le soudage génère des fumées et des gaz. Leur inhalation peut être dangereux pour votre santé.

- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- A l'intérieur, ventiler la zone et/ou utiliser un échappement au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage.
- Si la ventilation est insuffisante, utiliser un respirateur à alimentation d'air homologué.
- Lire les spécifications de sécurité des matériaux (MSDSs) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraissants.
- Travailler dans un espace fermé seulement s'il est bien ventilé ou en portant un respirateur à alimentation d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l'air et abaisser le niveau d'oxygène provoquant des blessures ou des accidents mortels. S'assurer que l'air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.
- Ne pas souder des métaux munis d'un revêtement, tels que l'acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n'ait été enlevé dans la zone de soudure, que l'endroit soit bien ventilé, et si nécessaire, en portant un respirateur à alimentation d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.



## LES RAYONS DE L'ARC peuvent provoquer des brûlures dans les yeux et sur la peau.

Le rayonnement de l'arc du procédé de soudage génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de provoquer des brûlures dans les yeux et sur la peau. Des étincelles sont projetées pendant le soudage.

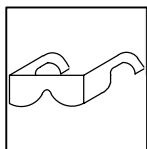
- Porter un casque de soudage muni d'un écran de filtre approprié pour protéger votre visage et vos yeux pendant le soudage ou pour regarder (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des protections approuvés pour les oreilles si le niveau sonore est trop élevé.
- Utiliser des écrans ou des barrières pour protéger des tiers de l'éclair et de l'éblouissement; demander aux autres personnes de ne pas regarder l'arc.
- Porter des vêtements de protection constitué dans une matière durable, résistant au feu (cuir ou laine) et une protection des pieds.



## LE SOUDAGE peut provoquer un incendie ou une explosion.

Le soudage effectué sur des conteneurs fermés tels que des réservoirs, tambours ou des conduites peut provoquer leur éclatement. Des étincelles peuvent être projetées de l'arc de soudure. La projection d'étincelles, des pièces chaudes et des équipements chauds peut provoquer des incendies et des brûlures. Le contact accidentel de l'électrode avec des objets métalliques peut provoquer des étincelles, une explosion, un surchauffement ou un incendie. Avant de commencer le soudage, vérifier et s'assurer que l'endroit ne présente pas de danger.

- Se protéger et d'autres personnes de la projection d'étincelles et de métal chaud.
- Ne pas souder dans un endroit où des étincelles peuvent tomber sur des substances inflammables.
- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité les recouvrir soigneusement avec des protections homologués.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu'ils n'aient été préparés correctement conformément à AWS F4.1 (voir les normes de sécurité).
- Brancher le câble sur la pièce la plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porte-électrode ou couper le fil à la pointe de contact.
- Porter des vêtements de protection dépourvus d'huile tels que des gants en cuir, une chemise en matériau lourd, des pantalons sans revers, des chaussures hautes et un couvre chef.
- Avant de souder, retirer toute substance combustible de vos poches telles qu'un allumeur au butane ou des allumettes.



## DES PARTICULES VOLANTES peuvent blesser les yeux.

- Le soudage, l'écaillage, le passage de la pièce à la brosse en fil de fer, et le meulage génèrent des étincelles et des particules métalliques volantes. Pendant la période de refroidissement des soudures, elles risquent de projeter du laitier.
- Porter des lunettes de sécurité avec écrans latéraux ou un écran facial.



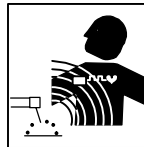
## LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.

- Fermer l'alimentation du gaz protecteur en cas de non utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d'un respirateur d'adduction d'air homologué.



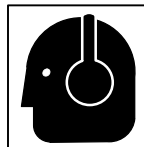
## DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.

- Ne pas toucher des parties chaudes à mains nues
- Prévoir une période de refroidissement avant d'utiliser le pistolet ou la torche.



## LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

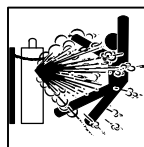
- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.



## LE BRUIT peut affecter l'ouïe.

Le bruit des processus et des équipements peut affecter l'ouïe.

- Porter des protections approuvés pour les oreilles si le niveau sonore est trop élevé.



## Si des BOUTEILLES sont endommagées, elles pourront exploser.

Des bouteilles de gaz protecteur contiennent du gaz sous haute pression. Si une bouteille est endommagée, elle peut exploser. Du fait que les bouteilles de gaz font normalement partie du procédé de soudage, les manipuler avec précaution.

- Protéger les bouteilles de gaz comprimé d'une chaleur excessive, des chocs mécaniques, du laitier, des flammes ouvertes, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte-bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais placer une torche de soudage sur une bouteille à gaz.
- Une électrode de soudage ne doit jamais entrer en contact avec une bouteille.
- Ne jamais souder une bouteille pressurisée – risque d'explosion.
- Utiliser seulement des bouteilles de gaz protecteur, régulateurs, tuyaux et raccords convenables pour cette application spécifique; les maintenir ainsi que les éléments associés en bon état.
- Ne pas tenir la tête en face de la sortie en ouvrant la soupape de la bouteille.
- Maintenir le chapeau de protection sur la soupape, sauf en cas d'utilisation ou de branchement de la bouteille.
- Lire et suivre les instructions concernant les bouteilles de gaz comprimé, les équipements associés et les publications P-1 CGA énumérées dans les normes de sécurité.

## 1-3. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance



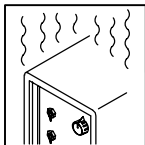
### Risque D'INCENDIE OU D'EXPLOSION.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Ne pas installer l'appareil à proximité de produits inflammables
- Ne pas surcharger l'installation électrique – s'assurer que l'alimentation est correctement dimensionnée et protégée avant de mettre l'appareil en service.



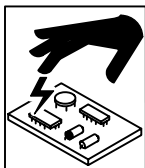
### LA CHUTE DE L'APPAREIL peut blesser.

- Utiliser l'anneau de levage uniquement pour soulever l'appareil, NON PAS les chariot, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un engin d'une capacité appropriée pour soulever l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.



### L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- Prévoir une période de refroidissement, respecter le cycle opératoire nominal.
- Réduire le courant ou le cycle opératoire avant de recommencer le soudage.
- Ne pas obstruer les passages d'air du poste.



### LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Établir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimés.



### DES ORGANES MOBILES peuvent provoquer des blessures.

- Ne pas s'approcher des organes mobiles.
- Ne pas s'approcher des points de coincement tels que des rouleaux de commande.



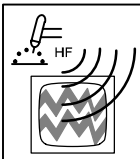
### LES FILS DE SOUDAGE peuvent provoquer des blessures.

- Ne pas appuyer sur la gachette avant d'en avoir reçu l'instruction.
- Ne pas diriger le pistolet vers soi, d'autres personnes ou toute pièce mécanique en engageant le fil de soudage.



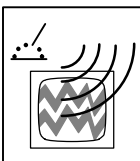
### DES ORGANES MOBILES peuvent provoquer des blessures.

- Rester à l'écart des organes mobiles comme le ventilateur.
- Maintenir fermés et fixement en place les portes, panneaux, recouvrements et dispositifs de protection.



### LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- Le rayonnement haute fréquence peut provoquer des interférences avec les équipements de radio-navigation et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.
- Si le FCC signale des interférences, arrêter immédiatement l'appareil.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et un blindage pour réduire les interférences éventuelles.



### LE SOUDAGE À L'ARC risque de provoquer des interférences.

- L'énergie électromagnétique risque de provoquer des interférences pour l'équipement électronique sensible tel que les ordinateurs et l'équipement commandé par ordinateur tel que les robots.
- Veiller à ce que tout l'équipement de la zone de soudage soit compatible électromagnétiquement.
- Pour réduire la possibilité d'interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à souder à une distance de 100 mètres de tout équipement électronique sensible.
- Veiller à ce que ce poste de soudage soit posé et mis à la terre conformément à ce mode d'emploi.
- En cas d'interférences après avoir pris les mesures précédentes, il incombe à l'utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l'utilisation de câbles blindés, l'utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.



### LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.

## 1-4. Principales normes de sécurité

*Safety in Welding and Cutting*, norme ANSI Z49.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

*Safety and Health Standards*, OSHA 29 CFR 1910, du Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

*Recommended Safe Practice for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances*, norme AWS F4.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

*National Electrical Code*, NFPA Standard 70, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1, de la Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

*Règles de sécurité en soudage, coupage et procédés connexes*, norme CSA W117.2, de l'Association canadienne de normalisation, vente de normes, 178 Rexdale Boulevard, Rexdale (Ontario) Canada M9W 1R3.

*Safe Practices For Occupation And Educational Eye And Face Protection*, norme ANSI Z87.1, de l'American National Standards Institute, 1430 Broadway, New York, NY 10018.

*Cutting and Welding Processes*, norme NFPA 51B, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

## 1-5. Information sur les champs électromagnétiques

Données sur le soudage électrique et sur les effets, pour l'organisme, des champs magnétiques basse fréquence

Le courant de soudage, pendant son passage dans les câbles de soudage, causera des champs électromagnétiques. Il y a eu et il y a encore un certain souci à propos de tels champs. Cependant, après avoir examiné plus de 500 études qui ont été faites pendant une période de recherche de 17 ans, un comité spécial ruban bleu du National Research Council a conclu: "L'accumulation de preuves, suivant le jugement du comité, n'a pas démontré que l'exposition aux champs magnétiques et champs électriques à haute fréquence représente un risque à la santé humaine". Toutefois, des études sont toujours en cours et les preuves continuent à être examinées. En attendant que les conclusions finales de la recherche soient établies, il vous serait souhaitable de réduire votre exposition aux champs électromagnétiques pendant le soudage ou le coupage.

Afin de réduire les champs électromagnétiques dans l'environnement de travail, respecter les consignes suivantes :

- 1 Garder les câbles ensemble en les torsadant ou en les attachant avec du ruban adhésif.
- 2 Mettre tous les câbles du côté opposé de l'opérateur.
- 3 Ne pas courber pas et ne pas entourer pas les câbles autour de votre corps.
- 4 Garder le poste de soudage et les câbles le plus loin possible de vous.
- 5 Relier la pince de masse le plus près possible de la zone de soudure.

### Consignes relatives aux stimulateurs cardiaques :

Les personnes qui portent un stimulateur cardiaque doivent avant tout consulter leur docteur. Si vous êtes déclaré apte par votre docteur, il est alors recommandé de respecter les consignes ci-dessus.

# SECTION 2 – SPECIFICATIONS

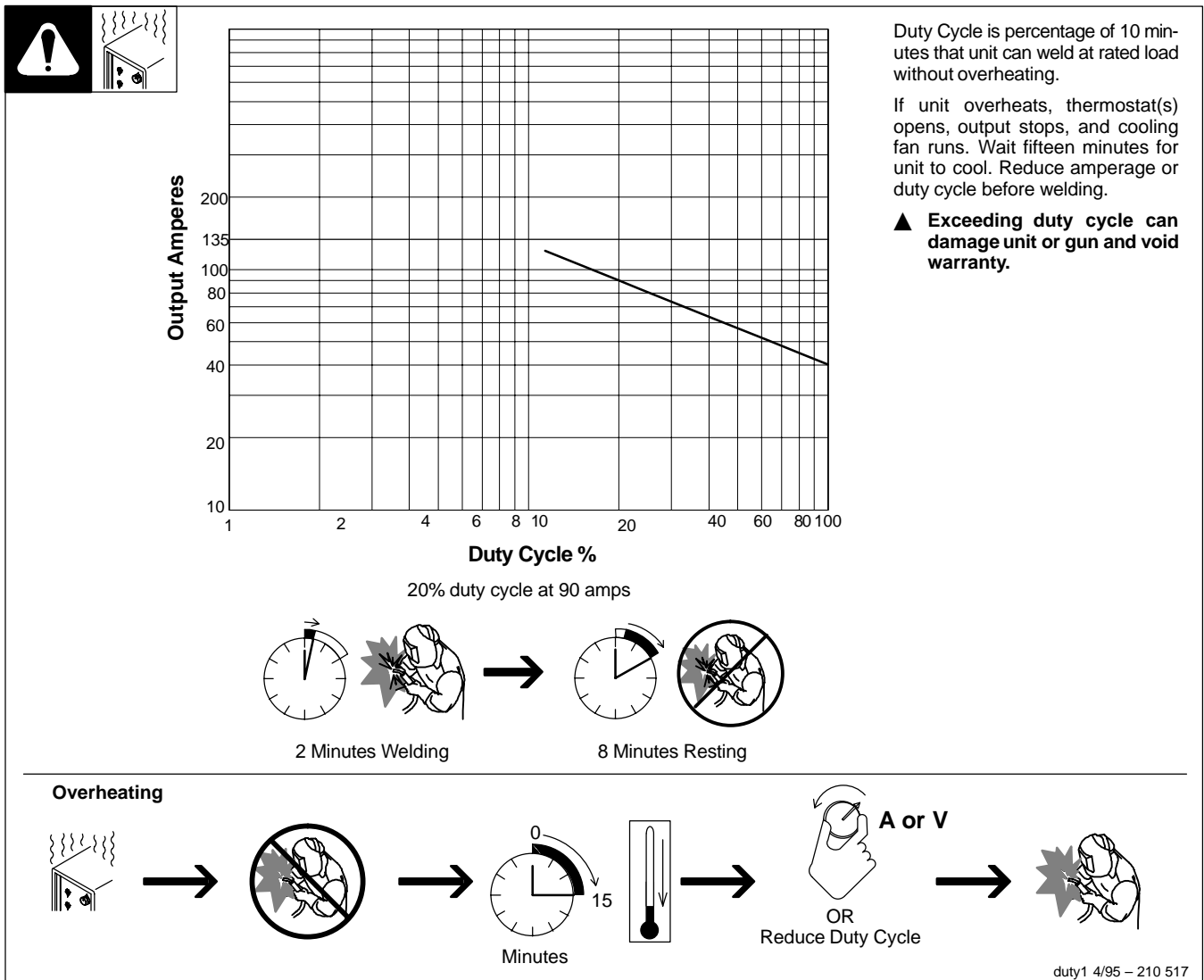
## 2-1. Specifications

Rated Welding Output	Amperage Range	Maximum Open-Circuit Voltage DC	Amperes Input at Rated Load Output 115 V, 60 Hz, Single-Phase	KVA	KW	Weight W/ Gun	Overall Dimensions
90 A @ 19 Volts DC, 20% Duty Cycle 63 A @ 21 Volts DC, 20% Duty Cycle*	30 – 125	29	20 15*	2.90 2.20*	2.50 1.77*	50 lb (22.7 kg)	Length: 16-7/8 in (429 mm) Width: 9-7/8 in (251 mm) Height: 12-1/8 in (308 mm)
Wire Type And Dia	Flux Cored	Solid/ Stainless**	Wire Feed Speed Range				
	.030 – .035 in (0.8 – 0.9 mm)	.024 – .030 in (0.6 – 0.8 mm)	0 – 500 IPM (0 – 13 m/min) At No Load 0 – 415 IPM (0 – 11 m/min) Feeding Wire				

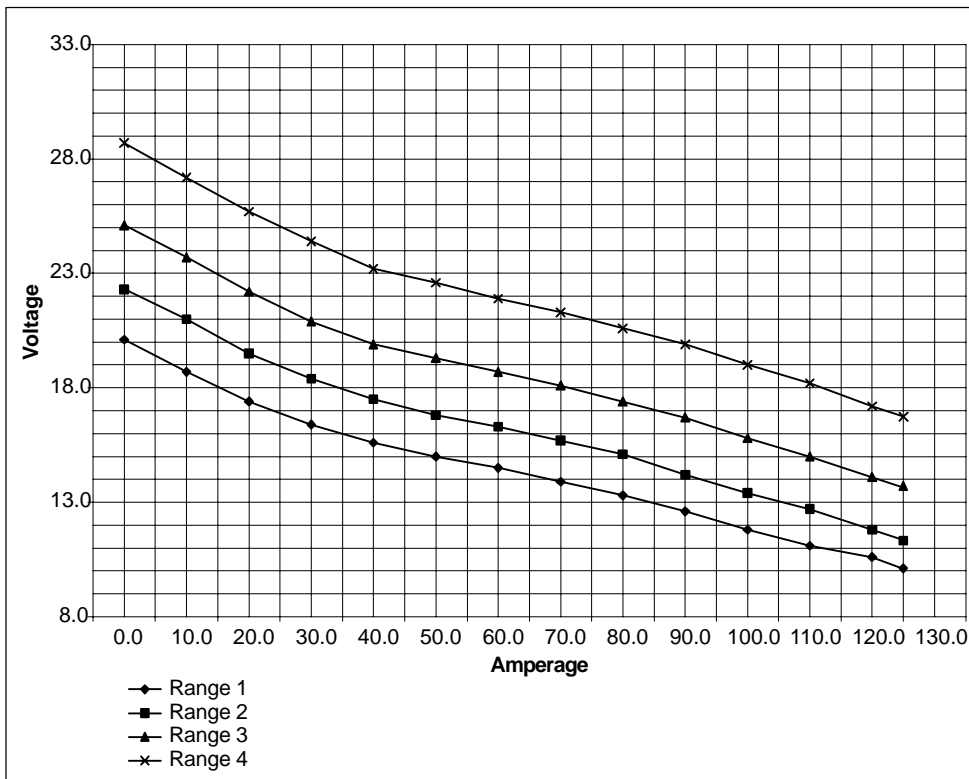
\* CSA Rating

\*\* When shielding gas is required, gas solenoid valve must be installed.

## 2-2. Duty Cycle And Overheating



## 2-3. Volt-Ampere Curves

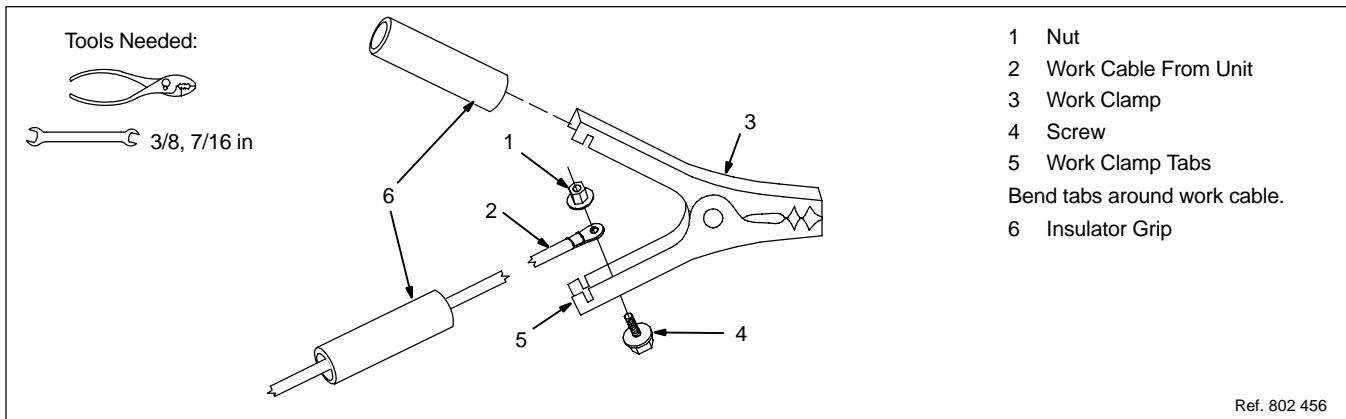


The volt-ampere curves show the minimum and maximum voltage and amperage output capabilities of the welding power source. Curves of other settings fall between the curves shown.

ssb1.1 10/91 – 210 518

## SECTION 3 – INSTALLATION

### 3-1. Installing Work Clamp



Ref. 802 456

### 3-2. Process/Polarity Table

Process	Polarity	Cable Connections	
		Cable To Gun	Cable To Work Clamp
FCAW – Self-shielding wire – no shielding gas	DCEN – Straight Polarity	Connect to negative (–) output terminal	Connect to positive (+) output terminal
GMAW* – Solid wire with shielding gas	DCEP – Reverse polarity	Connect to positive (+) output terminal	Connect to negative (–) output terminal

\* Unit must have gas solenoid valve installed.

### 3-3. Changing Polarity

<b>CHANGING POLARITY</b>	
<b>DCEN</b> Electrode Negative For Flux Core Wire	<b>DCEP</b> Electrode Positive For Solid Wire
<p>1 →</p> <p>TIP HOLDER</p> <p>WORK</p>	<p>← 2</p> <p>TIP HOLDER</p> <p>WORK</p>

1 Lead Connections For Direct Current Electrode Negative (DCEN)

2 Lead Connections For Direct Current Electrode Positive (DCEP)

Always read and follow wire manufacturer's recommended polarity, and see Section 3-2.

Close door.

Ref. 210 428

### 3-4. Installing Gas Supply

NOTE

*This Section only applies to MIG units or units equipped with MIG kit.*

Tools Needed:  
 11/16, 1-1/8 in

6

4

5

7

1

2

3

Shielding Gas

Obtain gas cylinder and chain to running gear, wall, or other stationary support so cylinder cannot fall and break off valve.

- 1 Cap
- 2 Cylinder Valve

Remove cap, stand to side of valve, and open valve slightly. Gas flow blows dust and dirt from valve. Close valve.

- 3 Cylinder
- 4 Regulator/Flowmeter

Install regulator/flowmeter to cylinder valve. Be sure that gauge face is vertical for viewing and adjusting.

- 5 Regulator/Flowmeter Gas Hose Connection
- 6 Welding Power Source Gas Hose Connection



Connect gas hose between regulator/flowmeter gas hose connection, and fitting on rear of welding power source.

- 7 Flow Adjust

Turn flow adjust screw to increase or decrease gas flow. Flow rate should be set when gas is flowing through welding power source and welding gun. Turn Range switch to Purge or Fan Only position. Press gun trigger to start gas flow. Typical flow rate is 20 cfh (cubic feet per hour). Check wire manufacturer's recommended flow rate.

802 028 / Ref. 803 379-A


### 3-5. Installing Wire Spool And Adjusting Hub Tension



#### Installing 4 in (102 mm) Wire Spool

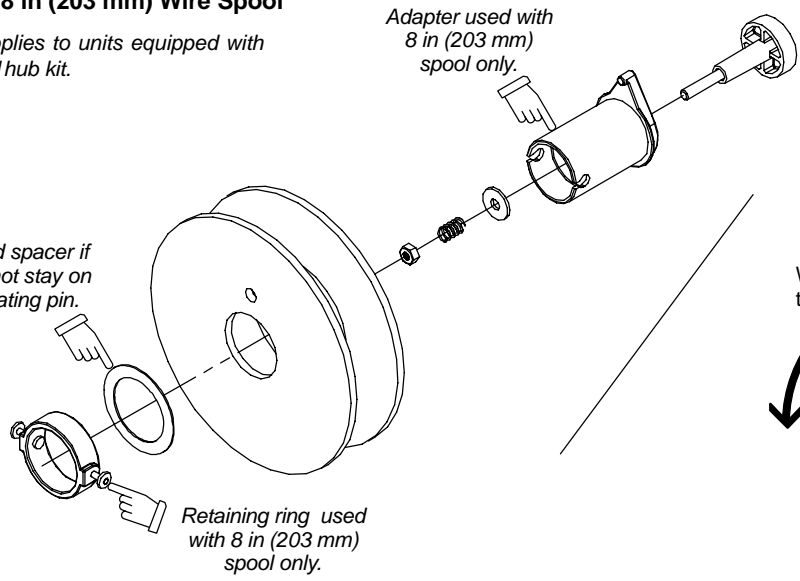
When a slight force is needed to turn spool, tension is set.

#### Installing 8 in (203 mm) Wire Spool

 Only applies to units equipped with optional hub kit.

Adapter used with 8 in (203 mm) spool only.

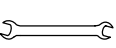


Use supplied spacer if spool does not stay on adapter locating pin.



Retaining ring used with 8 in (203 mm) spool only.

When a slight force is needed to turn spool, tension is set.

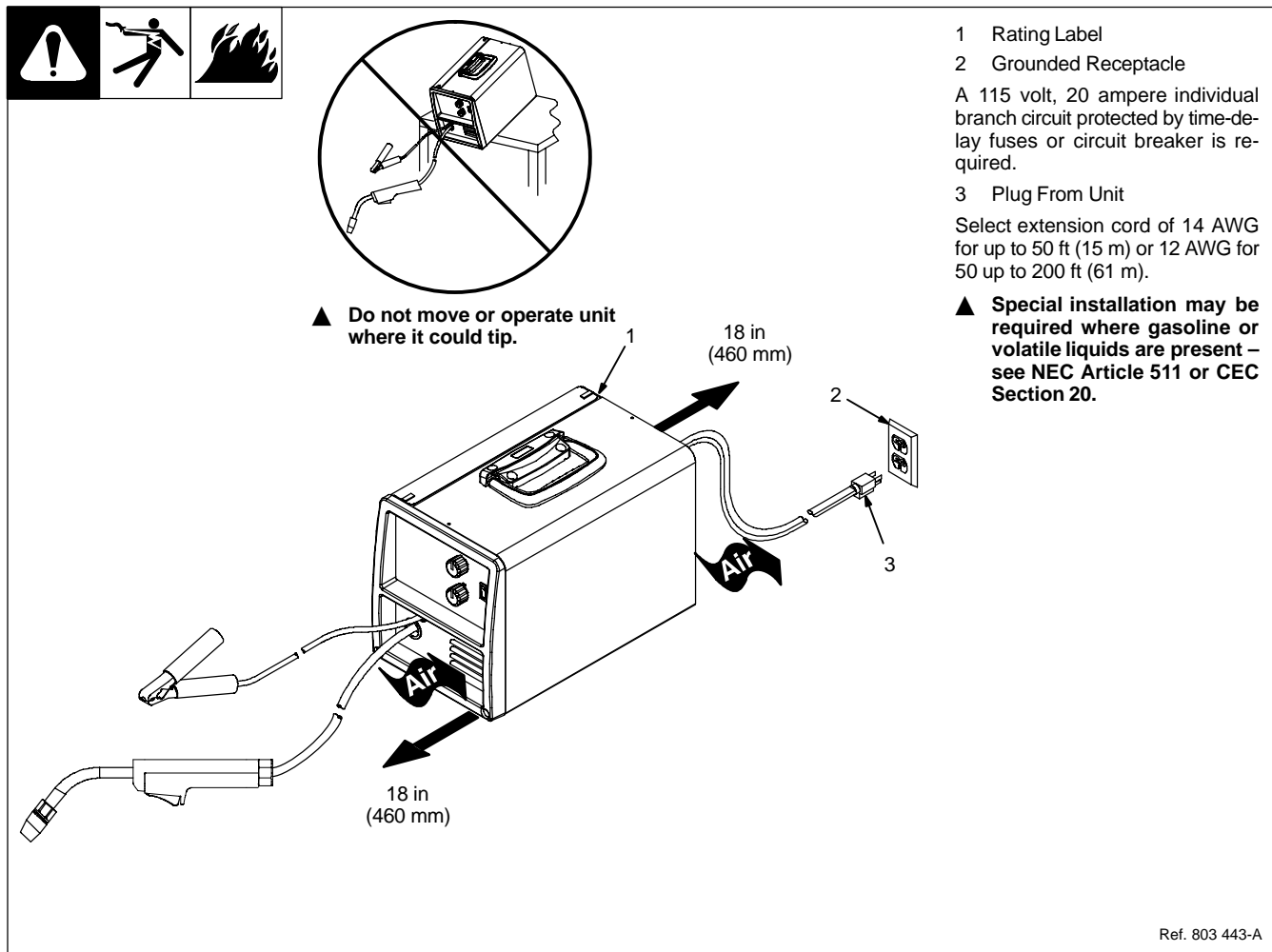
Tools Needed:

 1/2 in

802 971 / 803 012 / 803 013 -A



### 3-6. Selecting A Location And Connecting Input Power For 115 VAC Model

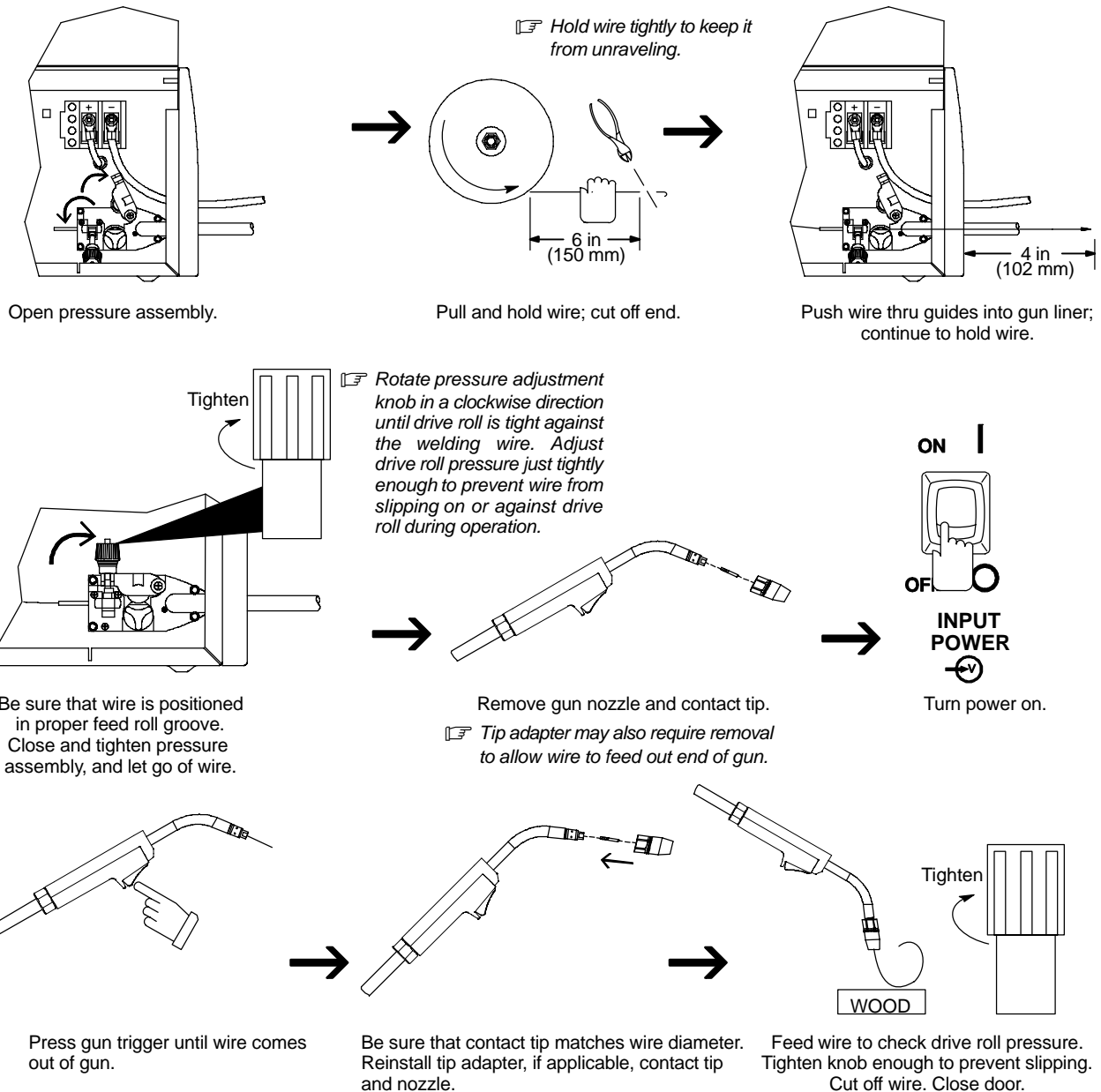
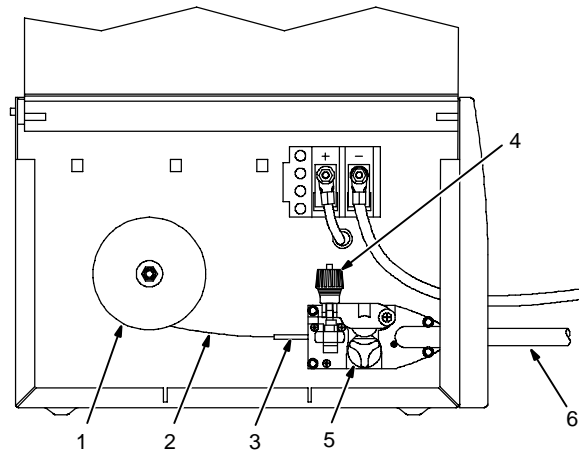
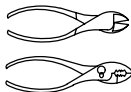


### 3-7. Threading Welding Wire



- 1 Wire Spool
  - 2 Welding Wire
  - 3 Inlet Wire Guide
  - 4 Pressure Adjustment Knob
  - 5 Drive Roll
  - 6 Gun Cable
- Lay gun cable out straight.

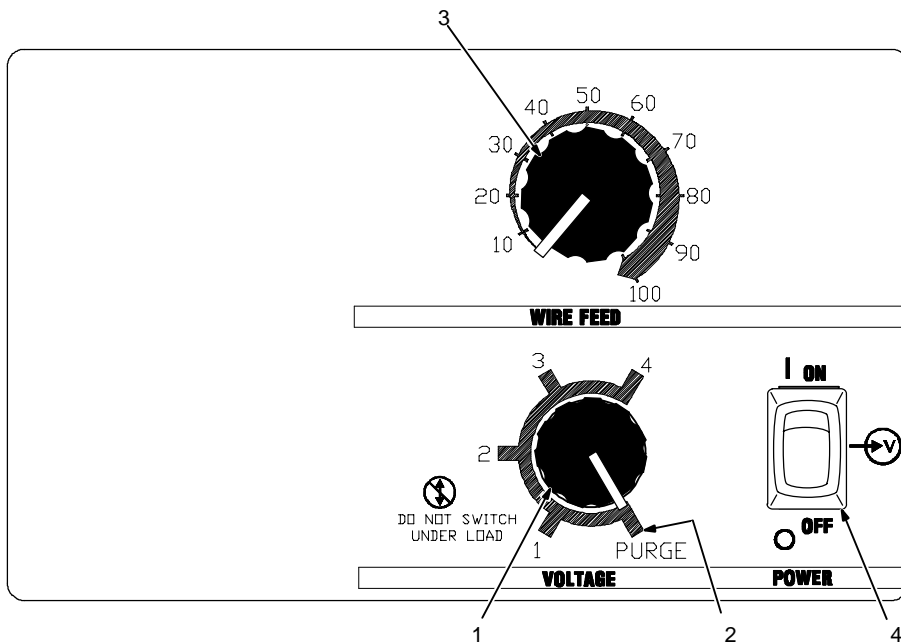
Tools Needed:



Ref. 803 444-A / Ref. 205 837

## SECTION 4 – OPERATION

### 4-1. Controls



#### 1 Voltage Switch

Use control to select the weld voltage range. As the thickness of material increases, a higher voltage range must be selected (see weld setting label in welding power source or Section 4-2 as applicable). **Do not switch under load.**

Switch must “click” into detent position 1, 2, 3, 4, or purge for proper contact.

#### 2 Voltage Switch - Fan Only Or Purge Position

Fan runs but there is no weld output.

#### 3 Wire Feed Control

Use control to select a wire feed speed. As Voltage switch setting increases, wire speed range also increases (see weld setting label in welding power source or Section 4-2 as applicable).

#### 4 Power Switch

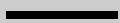
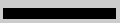
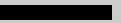
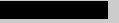



Ref. 210 427

4-2. Weld Parameter Chart

Welding Guide for				
Settings are approximate. Adjust as required. **Thicker materials can be welded using proper technique, joint preparation, and multiple passes.				
Material Being Welded	Wire Type, and Polarity Setting	Suggested Shielding Gas 20-30 cfh Flow Rate	Diameter of Wire Being Used	
Steel	Flux Core E71T-GS (DCEN)	No Shielding Gas Required Good for Windy or Outdoor Applications	.030" (0.8 mm)	
			.035" (0.9 mm)	
To weld with the following wires, gas shielding is required.				
Steel	Solid Wire ER70S-6 (DCEP)	C25 Gas Mixture (75% Argon / 25% CO2) Produces less Spatter Better Appearance	.024" (0.6 mm)	
			.030" (0.8 mm)	
Stainless Steel	Stainless Steel (DCEP)	Tri-Mix (90% He / 7.5% Ar / 2.5% CO2)	.024" (0.6 mm)	
BEFORE OPERATING: Match contact tip to diameter of wire being used. Match feedroll groove to diameter of wire being used. Adjust tension knob per instructions in the manual.		CAUTION! Do not change Voltage Switch Knob position while welding.		

# 115 Volt Wire Welding Package

Recommended Voltage and Wire Feed Settings for Thickness of Metal Being Welded.  
Number on Left of Slash is Voltage Setting / Number on Right of Slash is Wire Feed Setting.

	 22 gauge (.8 mm)	 18 gauge (1.2 mm)	 16 gauge (1.6 mm)	 14 gauge (2.0 mm)	 12 gauge (2.5 mm)	 1/8 inch (3.2 mm)	 3/16 inch (4.8 mm)
	---	1 / 20	1 / 25	2 / 30	3 / 30	4 / 30	---
	---	2 / 15	2 / 25	3 / 30	4 / 30	4 / 30	4 / 30 **

A gas solenoid must be installed in the welder if not already included.







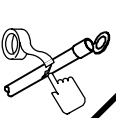
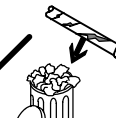


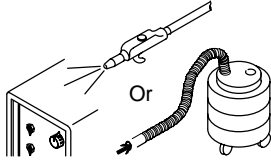
	1 / 45	2 / 55	2 / 60	3 / 75	4 / 80	4 / 80**	---
	---	2 / 20	3 / 20	3 / 25	4 / 25	4 / 25**	---
	---	---	3 / 25	4 / 30	4 / 30**	---	---

**NOTE:**



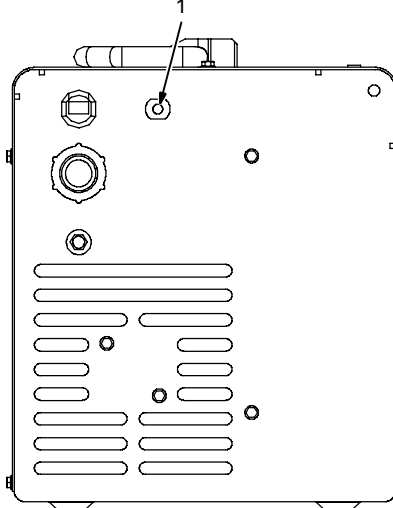
**Wire Feed Setting** listed is a starting value only - Wire Feed setting can be fine-tuned while welding. Wire Feed also depends on other variables such as stick out, travel speed, weld angle, cleanliness of metal, etc.

# SECTION 5 – MAINTENANCE & TROUBLESHOOTING

## 5-1. Routine Maintenance

  	<b>▲ Disconnect power before maintaining.</b>						
 <b>3 Months</b>							
Replace unreadable labels.			Repair or replace cracked weld cable.			Clean and tighten weld terminals.	
 <b>6 Months</b>							
Blow out or vacuum inside. During heavy service, clean monthly.							

## 5-2. Overload Protection

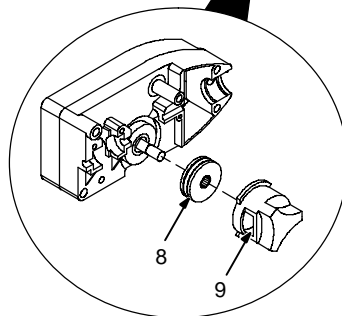
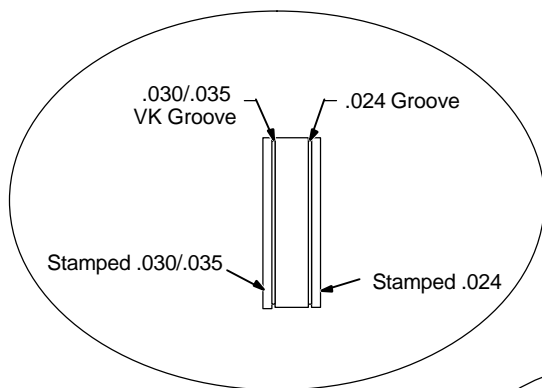
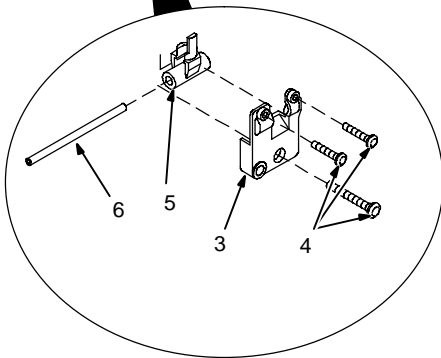
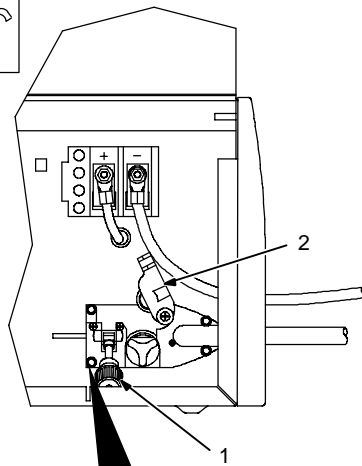
 	<p>1 Circuit Breaker CB1 CB1 protects unit from overload. If CB1 opens, unit shuts down. Reset breaker.</p>
	

803 379-A

## 5-3. Drive Motor Protection

Drive motor protection circuit protects drive motor from overload. If drive motor becomes inoperative, release gun trigger and wait until protection circuit resets allowing drive motor to feed wire again.

## 5-4. Changing Drive Roll Or Wire Inlet Guide



Tools Needed:



5/16 in

1 Pressure Adjustment Knob

2 Pressure Assembly

Pivot pressure adjustment knob down, and lift pressure assembly up.

3 Pivot Tube Plate

4 Securing Screws

5 Pressure Arm Pivot Tube

6 Inlet Wire Guide

Remove screws and pivot tube plate. Lift out pressure arm pivot tube, and slide inlet wire guide out of tube.

Slide replacement wire guide into tube, and place tube back into drive assembly. Be sure tip of wire guide is as close to drive roll as possible without touching.

Reinstall plate and tighten screws.

7 Retaining Knob

Rotate counterclockwise and remove knob.

8 Drive Roll

The drive roll consists of two different sized grooves. Each side is stamped with the proper size.

Select the groove that matches the wire size on the wire spool. Install drive roll onto motor shaft so that correct groove size stamp faces out away from drive housing.

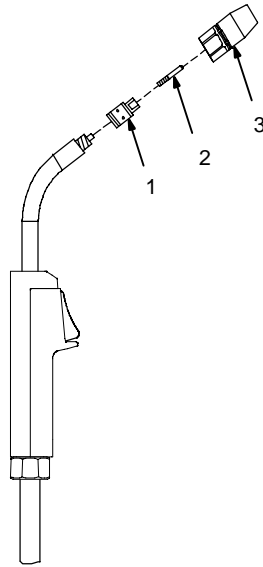
9 Retaining Knob Opening

Install retaining knob by placing opening over drive roll (opening faces rear of unit). Rotate retaining knob clockwise to secure drive roll.

Position wire into outer groove of drive roll (see Section 3-7).

Ref. 802 444-B / 803 442-A

## 5-5. Replacing Gun Contact Tip



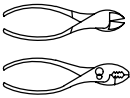
▲ Turn Off power before replacing contact tip.

- 1 Tip Adapter
- 2 Contact Tip
- 3 Nozzle

Cut off welding wire at contact tip. Remove nozzle.

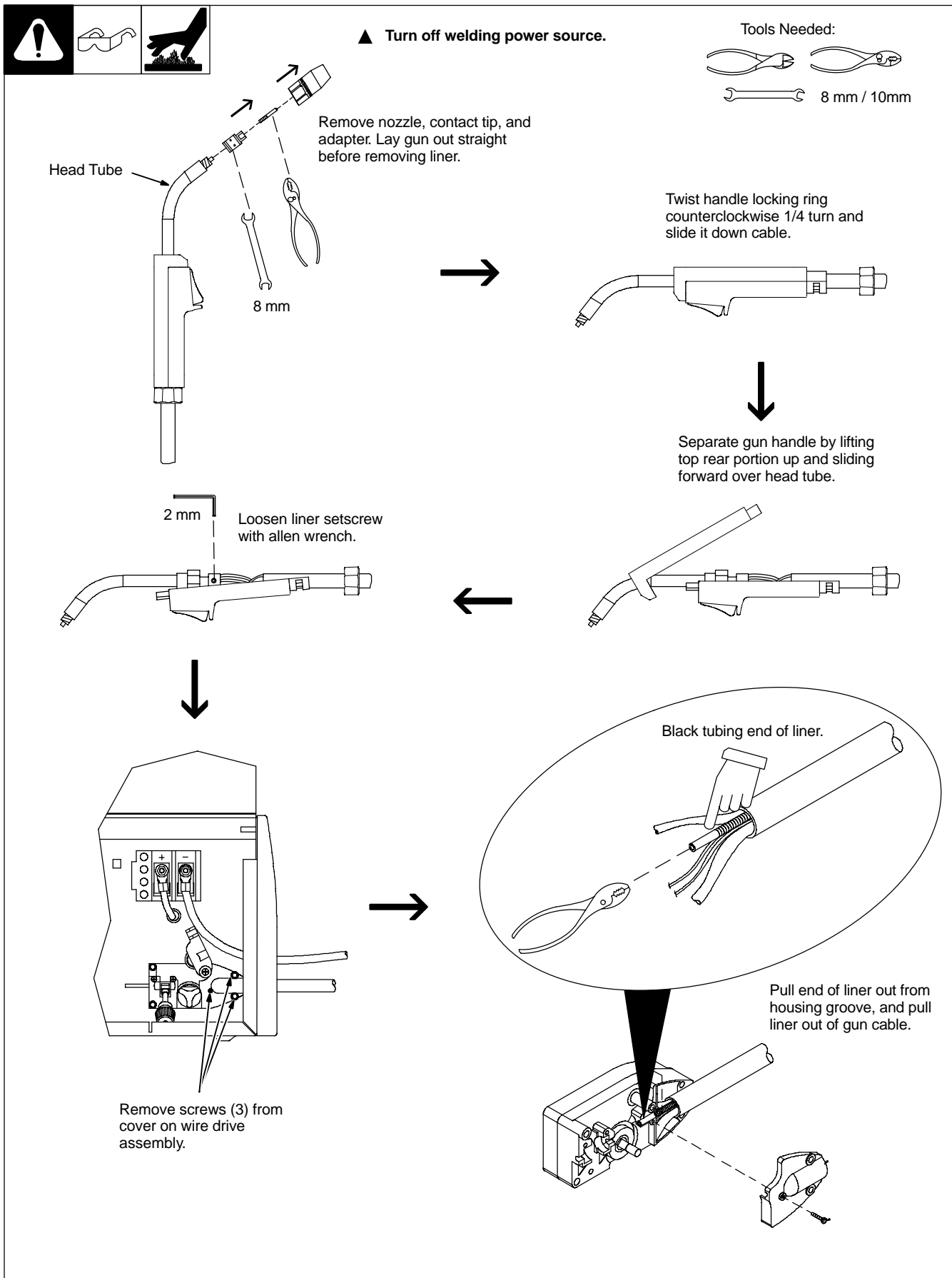
Remove contact tip from tip adapter and install new contact tip. Reinstall nozzle.

Tools Needed:

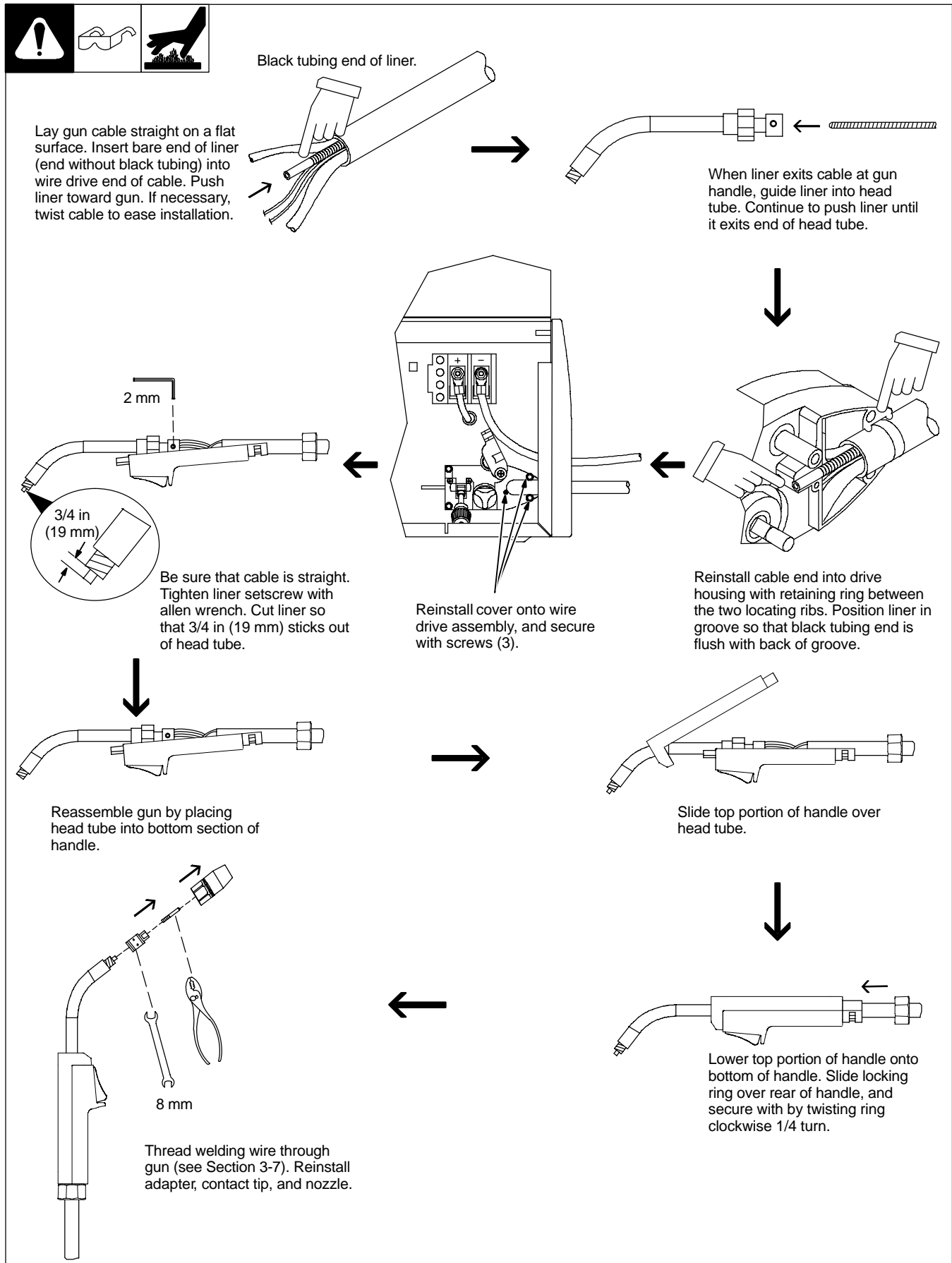




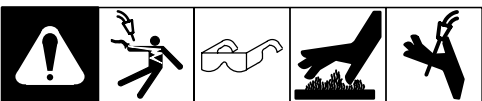
## 5-6. Cleaning Or Replacing Gun Liner



## 5-6. Cleaning Or Replacing Gun Liner (Continued)

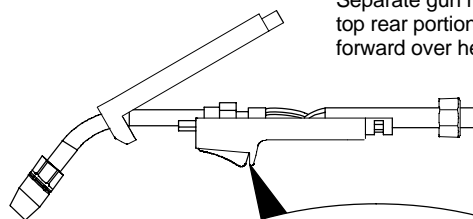
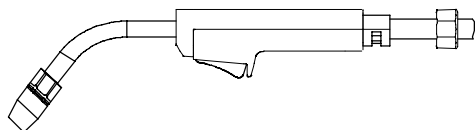


## 5-7. Replacing Switch And/Or Head Tube

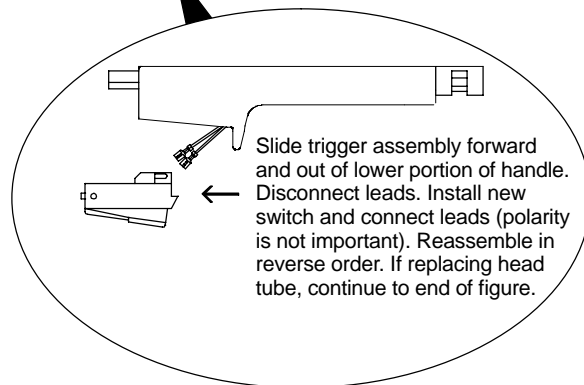


▲ Turn Off welding power source.

Twist handle locking ring counterclockwise 1/4 turn and slide it down cable.

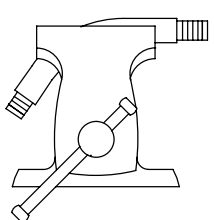


Separate gun handle by lifting top rear portion up and sliding forward over head tube.

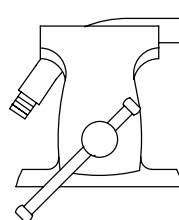


Slide trigger assembly forward and out of lower portion of handle. Disconnect leads. Install new switch and connect leads (polarity is not important). Reassemble in reverse order. If replacing head tube, continue to end of figure.

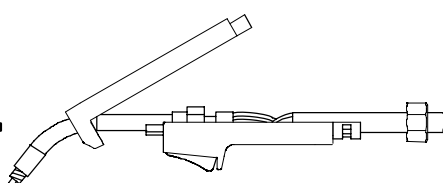
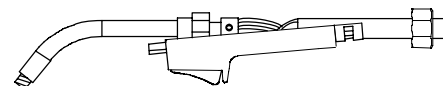
Remove nozzle, contact tip, and adapter. Secure head tube in vice. Loosen cable connector. Remove from vice and turn head tube out by hand.



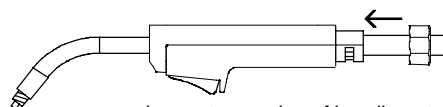
Hand-tighten head tube into cable connector. Place head tube in vice and tighten until cable connector is tight.



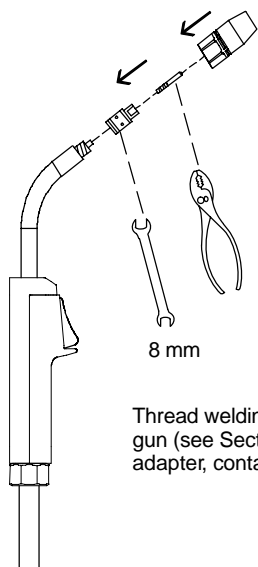
Reassemble gun by placing head tube into bottom section of handle.



Slide top portion of handle over head tube.

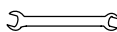


Lower top portion of handle onto bottom of handle. Slide locking ring over rear of handle, and secure with by twisting ring clockwise 1/4 turn.



Thread welding wire through gun (see Section 3-7). Reinstall adapter, contact tip, and nozzle.

Tools Needed:



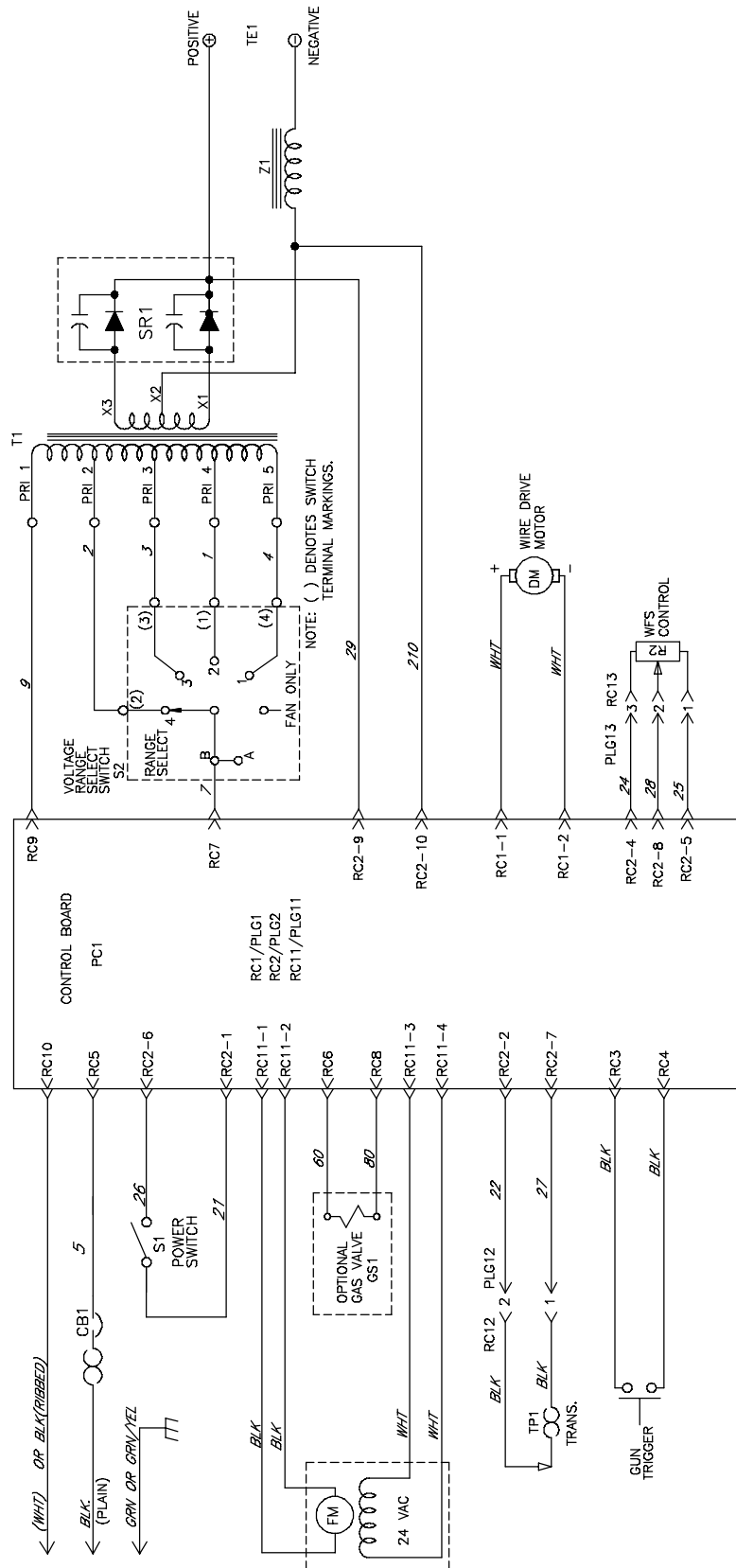
8 mm, 11/16 in

## 5-8. Troubleshooting Table



Trouble	Remedy
No weld output; wire does not feed; fan does not run.	Secure power cord plug in receptacle (see Section 3-6).
	Replace building line fuse or reset circuit breaker if open.
	Place Power switch in On position (see Section 4-1).
	Reset welding power source circuit breaker if open.
No weld output; wire does not feed; fan motor continues to run.	Thermostat TP1 open (overheating). Allow fan to run with gun trigger switch off; thermostat closes when unit has cooled (see Section 2-2).
	Be sure that Voltage switch is not set between ranges (see Section 4-1).
	Disassemble torch handle and check trigger switch lead connections, tighten or reconnect any loose connections.
No weld output; wire feeds.	Connect work clamp to get good metal to metal contact.
	Replace contact tip (see Section 5-5).
	Check for proper polarity connections (see Section 3-3).
Low weld output.	Connect unit to proper input voltage or check for low line voltage.
	Place voltage switch in desired position (see Section 4-1).
	If using an extension cord, check that wire size and length is the proper size for power rating of welding power source (see Section 2-1).
Electrode wire feeding stops during welding.	Straighten gun cable and/or replace damaged parts.
	Adjust drive roll pressure (see Section 3-7).
	Change to proper drive roll groove (see Section 5-4).
	Readjust hub tension (see Section 3-5).
	Replace contact tip if blocked (see Section 5-5).
	Clean or replace wire inlet guide or liner if dirty or plugged (see Section 5-4).
	Replace drive roll or pressure bearing if worn or slipping (see Section 5-4).
	Check and clear any restrictions at drive assembly and liner (see Section 3-7).
	Release gun trigger and allow gun and motor protection circuitry to reset.
	Have nearest Factory Authorized Service Agent check drive motor.

# SECTION 6 – ELECTRICAL DIAGRAM



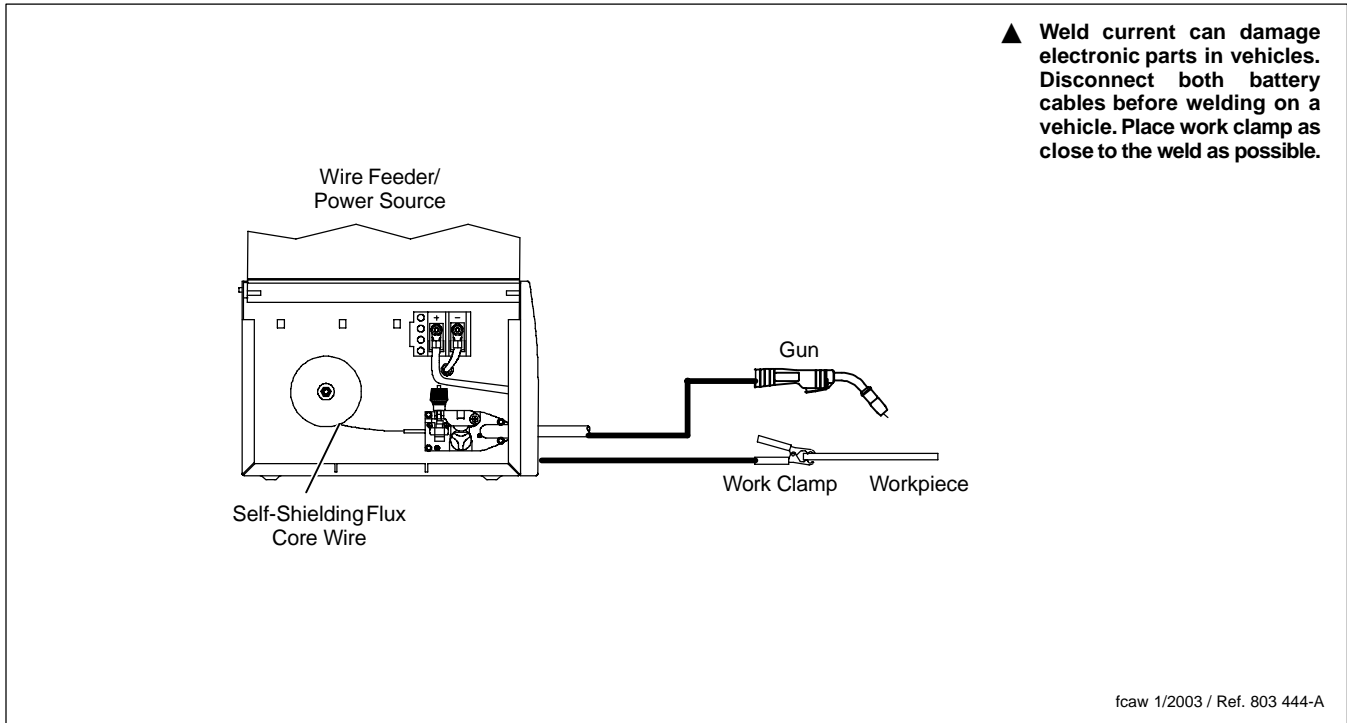
210 513

Figure 6-1. Circuit Diagram

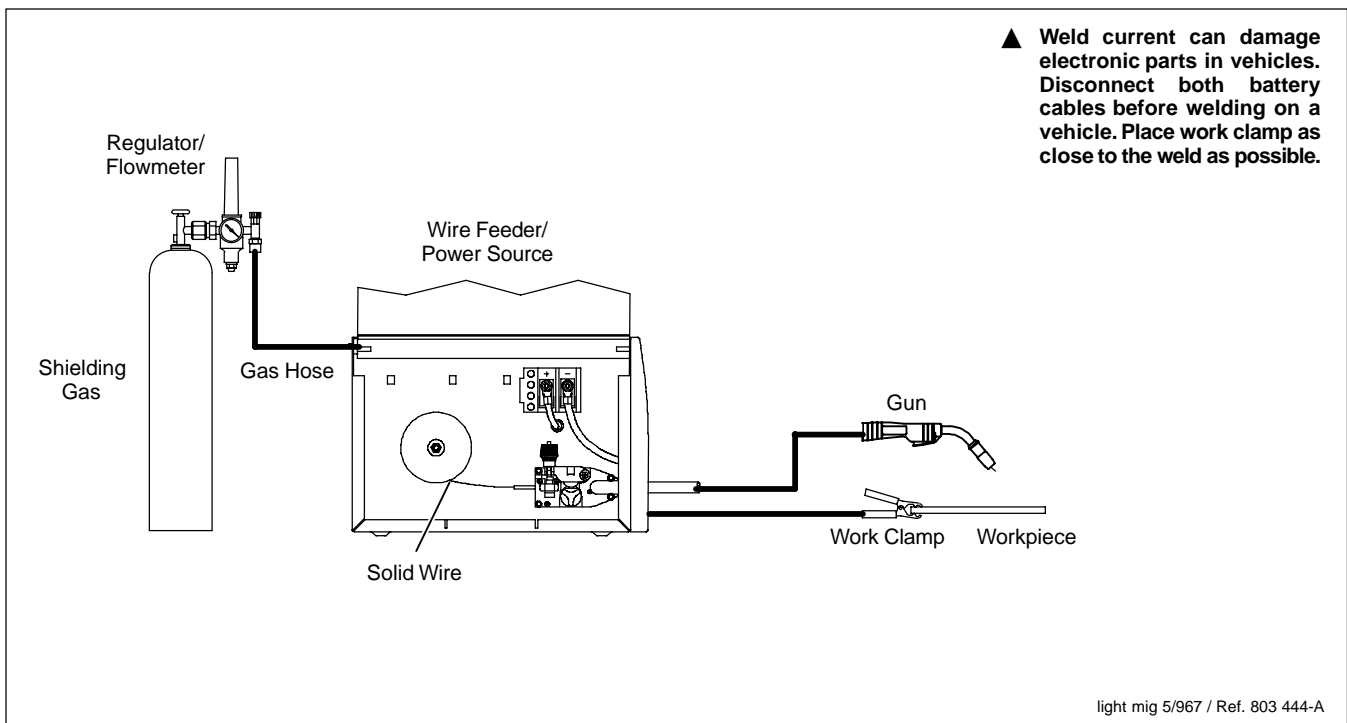
## SECTION 7 – WIRE WELDING GUIDELINES



### 7-1. Typical FCAW Process Connections



### 7-2. Typical MIG Process Connections

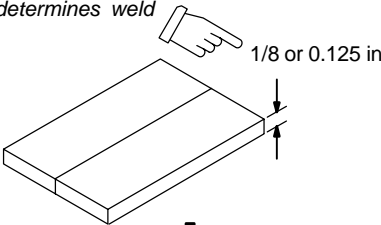


### 7-3. Typical Control Settings

#### NOTE

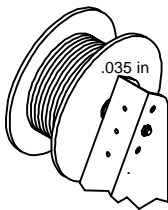
*These settings are guidelines only. Material and wire type, joint design, fitup, position, etc. affect settings. Test welds to be sure they comply to specifications.*

Material thickness determines weld parameters.



#### Convert Material Thickness to Amperage (A)

(0.001 in = 1 ampere)  
0.125 in = 125 A



Wire Size	Amperage Range
0.023 in	30 – 90 A
0.030 in	40 – 145 A
0.035 in	50 – 180 A

#### Select Wire Size

Wire Size	Recommendation	Wire Speed (Approx.)
0.023 in	3.5 in per ampere	$3.5 \times 125 \text{ A} = 437 \text{ ipm}$
0.030 in	2 in per ampere	$2 \times 125 \text{ A} = 250 \text{ ipm}$
0.035 in	1.6 in per ampere	$1.6 \times 125 \text{ A} = 200 \text{ ipm}$

#### Select Wire Speed (Amperage)

125 A based on 1/8 in material thickness

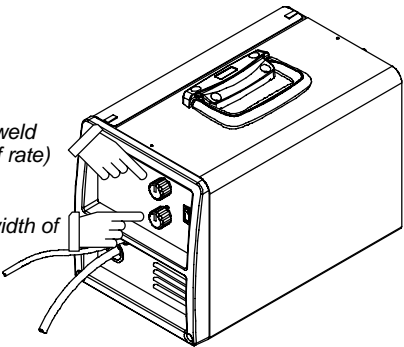
ipm = inches per minute

Low voltage: wire stubs into work  
High voltage: arc is unstable (spatter)  
Set voltage midway between high/low voltage

#### Select Voltage

Wire speed (amperage) controls weld penetration (wire speed = burn-off rate)

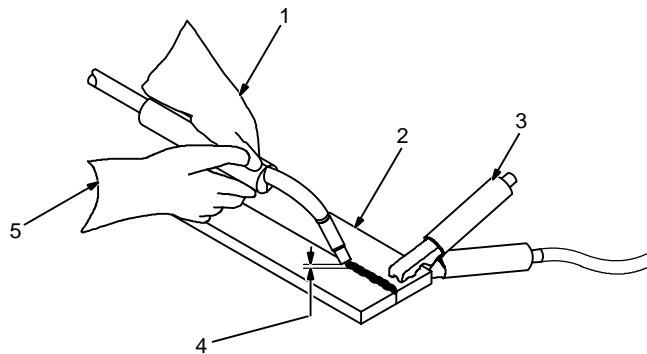
Voltage controls height and width of weld bead.



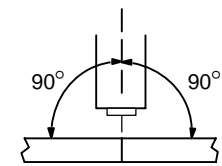
## 7-4. Holding And Positioning Welding Gun

### NOTE

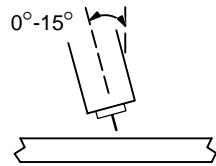
*Welding wire is energized when gun trigger is pressed. Before lowering helmet and pressing trigger, be sure wire is no more than 1/2 in (13 mm) past end of nozzle, and tip of wire is positioned correctly on seam.*



- 1 Hold Gun and Control Gun Trigger
- 2 Workpiece
- 3 Work Clamp
- 4 Electrode Extension (Stickout) 1/4 to 1/2 in (6 To 13 mm)
- 5 Cradle Gun and Rest Hand on Workpiece

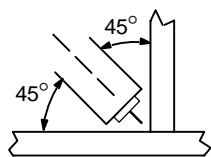


End View of Work Angle

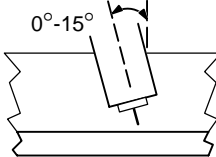


Side View of Gun Angle

#### GROOVE WELDS



End View of Work Angle



Side View of Gun Angle

#### FILLET WELDS

S-0421-A



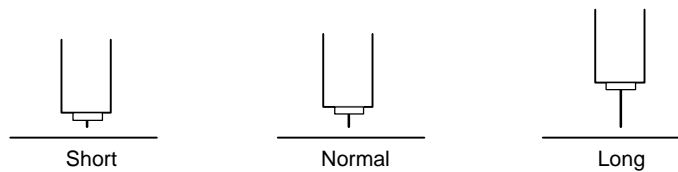
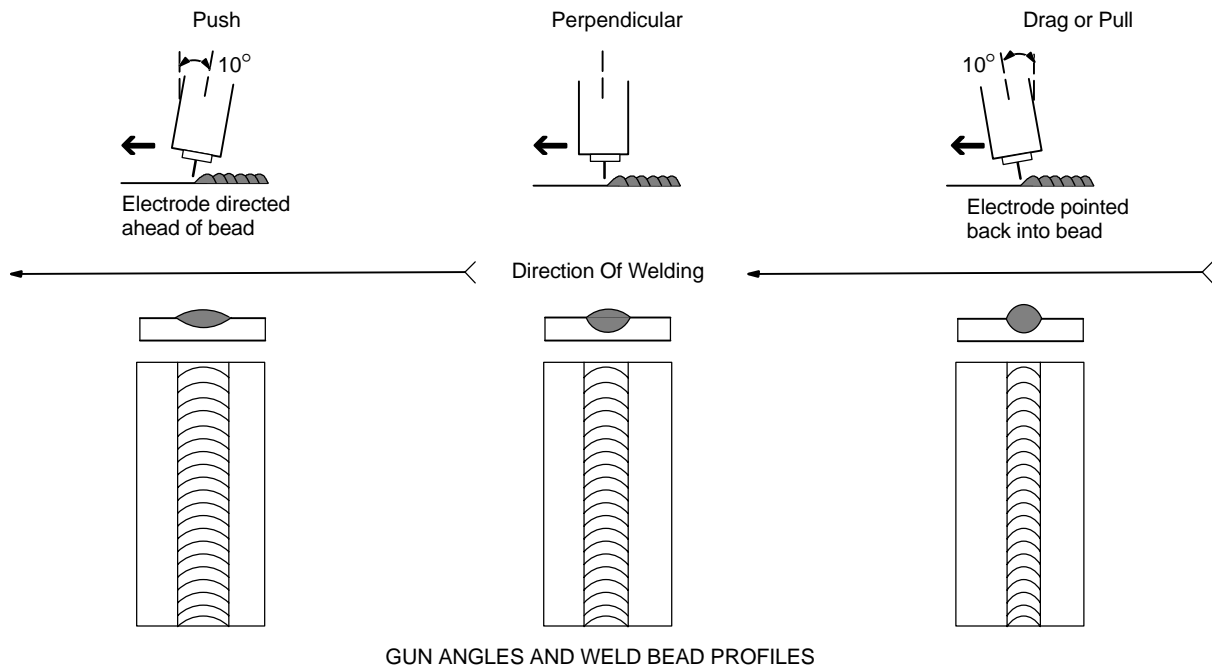
## 7-5. Conditions That Affect Weld Bead Shape

### NOTE

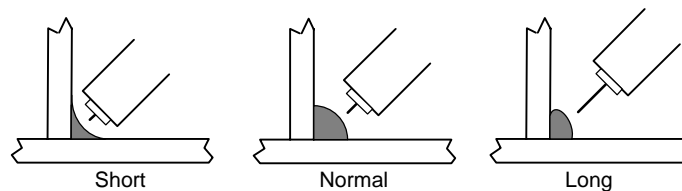


*Weld bead shape depends on gun angle, direction of travel, electrode extension (stickout), travel speed, thickness of base metal, wire feed speed (weld current), and voltage.*

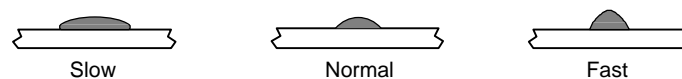
The Drag or Pull technique is generally recommended when welding with flux-cored tubular wire.



ELECTRODE EXTENSIONS (STICKOUT)



FILLET WELD ELECTRODE EXTENSIONS (STICKOUT)



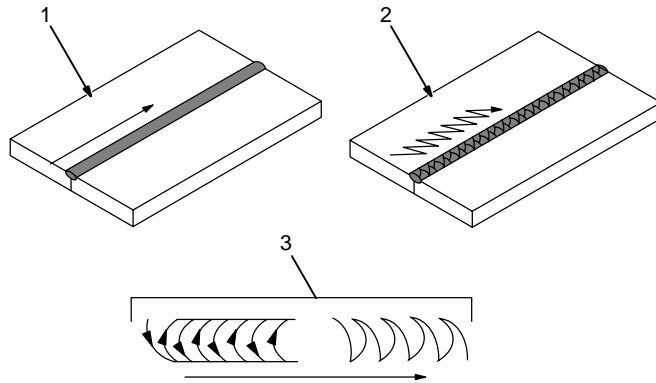
GUN TRAVEL SPEED

S-0634

## 7-6. Gun Movement During Welding

### NOTE

*Normally, a single stringer bead is satisfactory for most narrow groove weld joints; however, for wide groove weld joints or bridging across gaps, a weave bead or multiple stringer beads works better.*

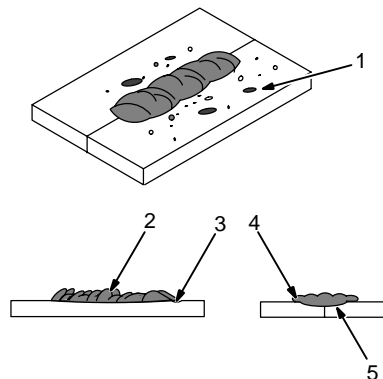


- 1 Stringer Bead – Steady Movement Along Seam
- 2 Weave Bead – Side To Side Movement Along Seam
- 3 Weave Patterns

Use weave patterns to cover a wide area in one pass of the electrode.

S-0054-A

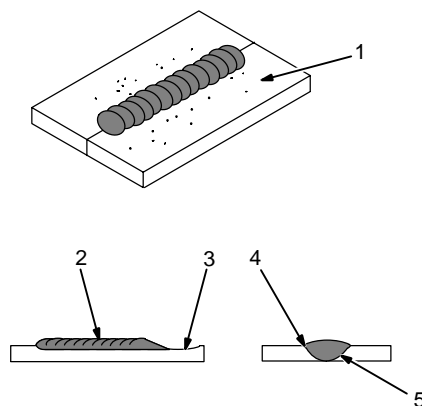
## 7-7. Poor Weld Bead Characteristics



- 1 Large Spatter Deposits
- 2 Rough, Uneven Bead
- 3 Slight Crater During Welding
- 4 Bad Overlap
- 5 Poor Penetration

S-0053-A

## 7-8. Good Weld Bead Characteristics



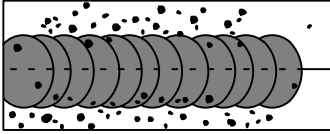
- 1 Fine Spatter
- 2 Uniform Bead
- 3 Moderate Crater During Welding

Weld a new bead or layer for each 1/8 in (3.2 mm) thickness in metals being welded.

- 4 No Overlap
- 5 Good Penetration into Base Metal

S-0052-B

## 7-9. Troubleshooting – Excessive Spatter

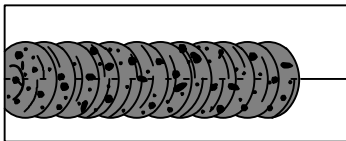


Excessive Spatter – scattering of molten metal particles that cool to solid form near weld bead.

S-0636

Possible Causes	Corrective Actions
Wire feed speed too high.	Select lower wire feed speed.
Voltage too high.	Select lower voltage range.
Electrode extension (stickout) too long.	Use shorter electrode extension (stickout).
Workpiece dirty.	Remove all grease, oil, moisture, rust, paint, undercoating, and dirt from work surface before welding.
Insufficient shielding gas at welding arc.	Increase flow of shielding gas at regulator/flowmeter and/or prevent drafts near welding arc.
Dirty welding wire.	Use clean, dry welding wire.
	Eliminate pickup of oil or lubricant on welding wire from feeder or liner.

## 7-10. Troubleshooting – Porosity

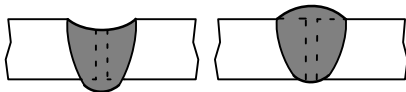


Porosity – small cavities or holes resulting from gas pockets in weld metal.

S-0635

Possible Causes	Corrective Actions
Insufficient shielding gas at welding arc.	Increase flow of shielding gas at regulator/flowmeter and/or prevent drafts near welding arc.
	Remove spatter from gun nozzle.
	Check gas hoses for leaks.
	Place nozzle 1/4 to 1/2 in (6-13 mm) from workpiece.
	Hold gun near bead at end of weld until molten metal solidifies.
Wrong gas.	Use welding grade shielding gas; change to different gas.
Dirty welding wire.	Use clean, dry welding wire.
	Eliminate pick up of oil or lubricant on welding wire from feeder or liner.
Workpiece dirty.	Remove all grease, oil, moisture, rust, paint, coatings, and dirt from work surface before welding.
	Use a more highly deoxidizing welding wire (contact supplier).
Welding wire extends too far out of nozzle.	Be sure welding wire extends not more than 1/2 in (13 mm) beyond nozzle.

## 7-11. Troubleshooting – Excessive Penetration



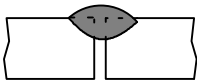
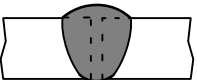
Excessive Penetration    Good Penetration

Excessive Penetration – weld metal melting through base metal and hanging underneath weld.

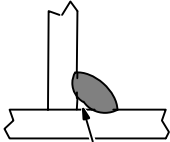
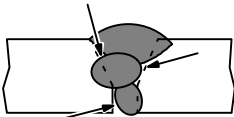
S-0639

Possible Causes	Corrective Actions
Excessive heat input.	Select lower voltage range and reduce wire feed speed.
	Increase travel speed.

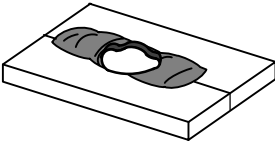
## 7-12. Troubleshooting – Lack Of Penetration

<div style="display: flex; align-items: center;">   <div style="margin-left: 20px;"> <p>Lack Of Penetration      Good Penetration</p> </div> </div> <div style="margin-top: 10px;"> <p>Lack Of Penetration – shallow fusion between weld metal and base metal.</p> </div>	
S-0638	
Possible Causes	Corrective Actions
Improper joint preparation.	Material too thick. Joint preparation and design must provide access to bottom of groove while maintaining proper welding wire extension and arc characteristics.
Improper weld technique.	Maintain normal gun angle of 0 to 15 degrees to achieve maximum penetration.
	Keep arc on leading edge of weld puddle.
	Be sure welding wire extends not more than 1/2 in (13 mm) beyond nozzle.
Insufficient heat input.	Select higher wire feed speed and/or select higher voltage range.
	Reduce travel speed.

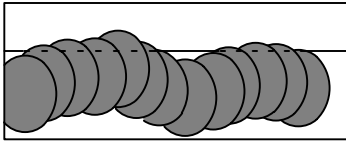
## 7-13. Troubleshooting – Incomplete Fusion

<div style="display: flex; align-items: center;">   </div> <div style="margin-top: 10px;"> <p>Incomplete Fusion – failure of weld metal to fuse completely with base metal or a preceeding weld bead.</p> </div>	
S-0637	
Possible Causes	Corrective Actions
Workpiece dirty.	Remove all grease, oil, moisture, rust, paint, undercoating, and dirt from work surface before welding.
Insufficient heat input.	Select higher voltage range and/or adjust wire feed speed.
Improper welding technique.	Place stringer bead in proper location(s) at joint during welding.
	Adjust work angle or widen groove to access bottom during welding.
	Momentarily hold arc on groove side walls when using weaving technique.
	Keep arc on leading edge of weld puddle.
	Use correct gun angle of 0 to 15 degrees.

## 7-14. Troubleshooting – Burn-Through

<div style="display: flex; align-items: center;">  </div> <div style="margin-top: 10px;"> <p>Burn-Through – weld metal melting completely through base metal resulting in holes where no metal remains.</p> </div>	
S-0640	
Possible Causes	Corrective Actions
Excessive heat input.	Select lower voltage range and reduce wire feed speed.
	Increase and/or maintain steady travel speed.

## 7-15. Troubleshooting – Waviness Of Bead

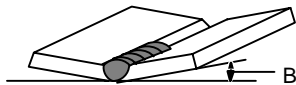


Waviness Of Bead – weld metal that is not parallel and does not cover joint formed by base metal.

S-0641

Possible Causes	Corrective Actions
Welding wire extends too far out of nozzle.	Be sure welding wire extends not more than 1/2 in (13 mm) beyond nozzle.
Unsteady hand.	Support hand on solid surface or use two hands.

## 7-16. Troubleshooting – Distortion



Base metal moves in the direction of the weld bead.

Distortion – contraction of weld metal during welding that forces base metal to move.


S-0642

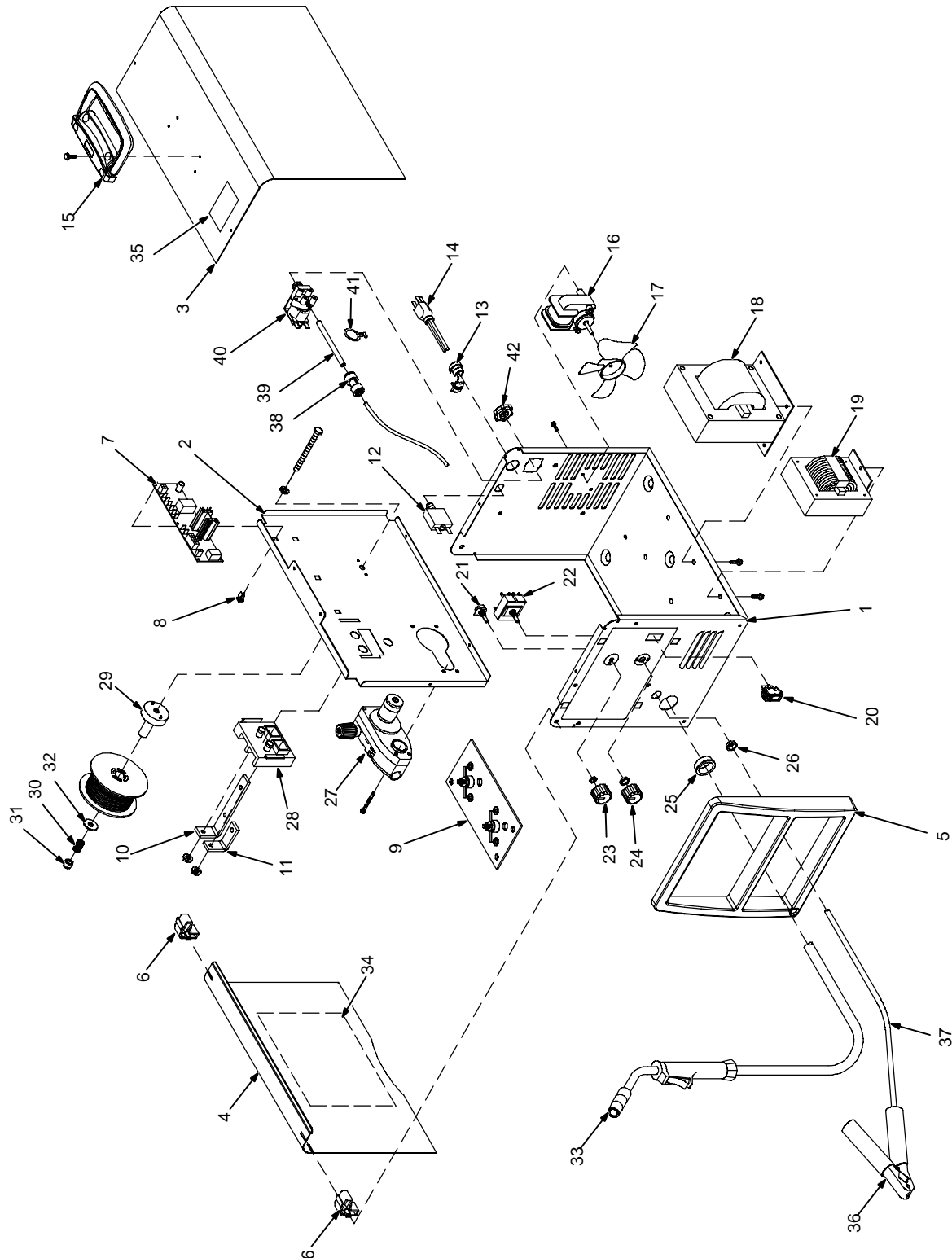
Possible Causes	Corrective Actions
Excessive heat input.	Use restraint (clamp) to hold base metal in position.
	Make tack welds along joint before starting welding operation.
	Select lower voltage range and/or reduce wire feed speed.
	Increase travel speed.
	Weld in small segments and allow cooling between welds.

## 7-17. Troubleshooting Guide For Semiautomatic Welding Equipment

Problem	Probable Cause	Remedy
Wire feed motor operates, but wire does not feed.	Too little pressure on wire feed rolls.	Increase pressure setting on wire feed rolls.
	Incorrect wire feed rolls.	Check size stamped on wire feed rolls, replace to match wire size and type if necessary.
	Wire spool brake pressure too high.	Decrease brake pressure on wire spool.
	Restriction in the gun and/or assembly.	Check and replace cable, gun, tip adapter, and contact tip if damaged. Check size of contact tip and cable liner, replace if necessary.
Wire curling up in front of the wire feed rolls (bird nesting).	Too much pressure on wire feed rolls.	Decrease pressure setting on wire feed rolls.
	Incorrect cable liner or gun contact tip size.	Check size of contact tip and check cable liner length and diameter, replace if necessary.
	Gun end not inserted into drive housing properly.	Loosen gun securing bolt in drive housing and push gun end into housing just enough so it does not touch wire feed rolls.
	Dirty or damaged (kinked) liner.	Replace liner.
Welding arc not stable.	Wire slipping in drive rolls.	Adjust pressure setting on wire feed rolls. Replace worn drive rolls if necessary.
	Wrong size gun liner or contact tip.	Match liner and contact tip to wire size and type.
	Incorrect voltage setting for selected wire feed speed on welding power source.	Readjust welding parameters.
	Loose connections at the gun weld cable or work cable.	Check and tighten all connections.
	Gun in poor shape or loose connection inside gun.	Repair or replace gun as necessary.

## SECTION 8 – PARTS LIST

 Hardware is common and not available unless listed.



803 446-A

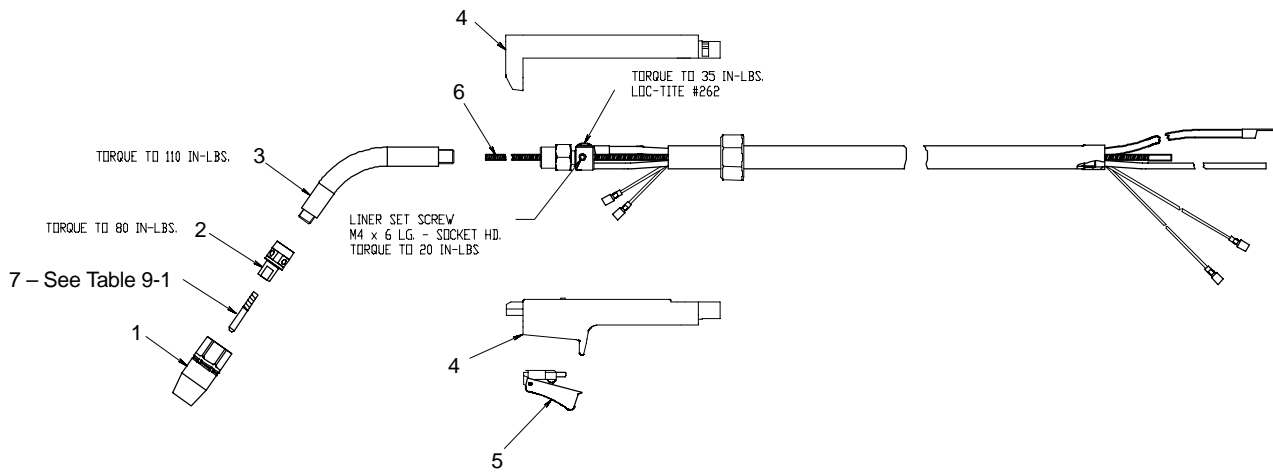
Figure 9-1. Main Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
<b>Figure 9-1. Main Assembly</b>				
... 1		210 432	CASE SECTION, front/bottom/rear	1
		210 530	BLANK, snap-in	1
... 2		210 433	BAFFLE, center	1
... 3		+210 434	WRAPPER, cover	1
... 4		210 435	DOOR, access	1
... 5		211 095	BEZEL, front	1
... 6		196 006	HINGE, door access	2
... 7		207 587	CIRCUIT CARD ASSY, control	1
... 8		134 201	STANDOFF	6
... 9		209 356	RECTIFIER, assy	1
... 10		209 392	BUS BAR, output positive	1
... 11		193 194	BUS BAR, output negative	1
... 12		210 109	CIRCUIT BREAKER, 25A	1
... 13		111 443	BUSHING, strain relief	1
... 14		147 545	CORD SET	1
... 15		208 015	HANDLE	1
... 16		209 467	MOTOR, fan 115VAC	1
... 17		210 413	BLADE, fan	1
... 18		209 213	TRANSFORMER	1
... 19		203 868	STABILIZER	1
... 20		196 575	SWITCH, rocker spst	1
... 21		209 873	POTENTIOMETER	1
... 22		409 477	SWITCH, rotary	1
... 23		211 338	KNOB, pointer	1
... 24		207 079	KNOB, pointer	1
... 25		210 398	BUSHING, snap-in	1
... 26		209 412	BUSHING, snap-in .500 dia	2
... 27		209 532	DRIVE, assy wire	1
... 28		193 144	INSULATOR, output stud	1
... 29		202 726	ADAPTER, spool hub	1
... 30		202 998	SPRING, cprsn	1
... 31		204 608	NUT	1
... 32		203 072	WASHER	1
... 33		208 877	WELDING GUN	1
... 34		210 428	LABEL, door chart	1
... 35		204 036	LABEL, warning	1
... 36		208 820	CLAMP, work	1
... 37		196 619	CABLE, work	1
... 38		♦209 905	ADAPTER, gas hose	1
... 39		♦209 907	TUBING, PVC	1
... 40		♦116 996	VALVE, 115vac	1
... 41		♦197 198	CABLE TIE	2
... 42		♦605 227	NUT, 750–14 Knurled	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

♦OPTIONAL

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**



**Figure 9-2. H-9 Gun**

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
<b>195 157 Figure 9-2. H-9 Gun</b>				
... 1		169 715	.. NOZZLE, slip type .500 orf flush	1
... 2		169 716	.. ADAPTER, contact tip	1
... 3		210 969	.. TUBE, head	1
... 4		211 450	.. HANDLE, top/bottom/cap	1
... 5		211 449	.. SWITCH, trigger	1
... 6		210 970	.. LINER, monocoil .023/.035 wire x 8ft	1
... 7		◆087 299	.. TIP, contact scr .023 wire x 1.125	
... 7		000 067	.. TIP, contact scr .030 wire x 1.125	1
... 7		◆000 068	.. TIP, contact scr .035 wire x 1.125	

**◆OPTIONAL**

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

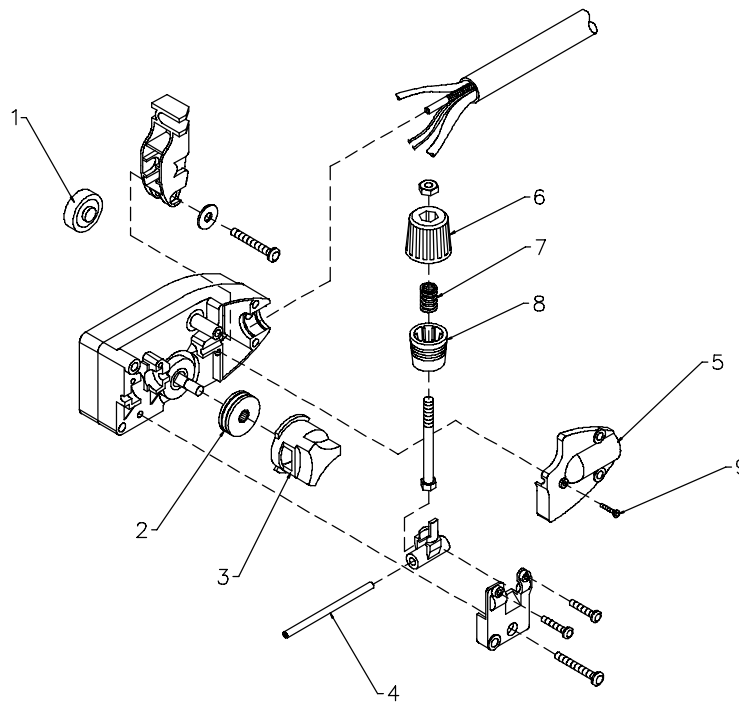
**Table 9-1. Contact Tip Options**

HOBART PART NO.	DESCRIPTION	REMARKS
196 134	Tip, contact scr .023 wire	Pkg of 5
196 131	Tip, contact scr .030 wire	Pkg of 5
196 132	Tip, contact scr .035 wire	Pkg of 5
196 137	Nozzle, slip type .500 orf flush	Qty 1
196 135	Adapter, contact tip	Qty 1

WELD-IT PART NO.	DESCRIPTION	REMARKS
770 174	Tip, contact scr .023 wire	Pkg of 5
770 177	Tip, contact scr .030 wire	Pkg of 5
770 180	Tip, contact scr .035 wire	Pkg of 5





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**Figure 9-3. Wire Drive Assembly**

Item No.	Part No.	Description	Quantity
<b>209 532      Figure 9-3. Wire Drive Assembly</b>			
... 1	212 377	BEARING, idler	1
... 2	212 379	ROLL, drive .024-.030/.035	1
... 3	212 383	RETAINER, feedroll	1
... 4	212 368	GUIDE, wire inlet	1
... 5	212 384	COVER, torch	1
... 6	212 385	KNOB, tension	1
... 7	212 387	SPRING, compression	1
... 8	212 388	CUP, spring	1
... 9	212 389	SCREW, torch cover	1

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

**Table 9-2. Options**

PART NO.	DESCRIPTION	REMARKS
194 776	Small Running Gear/Cylinder Rack	For One Small Gas Cylinder, 75 lb (34 kg)
195 157	H-9 Replacement Gun	8 ft length/.023-.035 wire size
195 158	MIG Conversion Kit	For Gas Metal Arc Welding (GMAW)
195 216	Hub Kit	For 8 in Wire Spool
195 186	Cover	To Protect Unit

NOTE: If individual parts are required, see Parts List chapter of this manual for part number to order.

## Notes

# HOBART 5/3/1 WARRANTY

Effective January 1, 2002

## Warranty Questions?

Call  
1-877-HOBART1  
for your local  
Hobart distributor.

## Service

You always get the fast, reliable response you need. Most replacement parts can be in your hands in 24 hours.

## Support

Need fast answers to the tough welding questions? Contact your distributor or call 1-800-332-3281. The expertise of the distributor and Hobart is there to help you, every step of the way.

5/3/1 WARRANTY applies to all Handler 135 and 175 models, Airforce 250, 250A, and 375 models, and Champion 10,000 models. This warranty also applies to the Beta-Mig 1800, Champ 1435, 2060, 8500 models, Ironman 250, Stickmate models, Tigmate models, and HSW-15 and HSW-25 spot welder models effective with Serial No. KK200262 and newer.

This limited warranty supersedes all previous Hobart warranties and is exclusive with no other guarantees or warranties expressed or implied.  
Hobart products are serviced by Hobart or Miller Authorized Service Agencies.

LIMITED WARRANTY – Subject to the terms and conditions below, Hobart/Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new Hobart equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Hobart. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Hobart/Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Hobart/Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Hobart/Miller will provide instructions on the warranty claim procedures to be followed.

Hobart/Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to a North American distributor or eighteen months after the equipment is sent to an International distributor.

1. 5 Years — Parts and Labor
  - \* Original Main Power Rectifiers
  - \* Transformers
  - \* Stabilizers
  - \* Reactors
  - \* Rotors, Stators and Brushes
2. 3 Years — Parts and Labor
  - \* Drive Systems
  - \* PC Boards
  - \* Idle Module
  - \* Solenoid Valves
  - \* Switches and Controls
  - \* Spot Welder Transformer
3. 1 Year — Parts and Labor Unless Specified (90 days for industrial use)
  - \* Motor-Driven Guns
  - \* MIG Guns/TIG Torches
  - \* Relays
  - \* Contactors
  - \* Regulators
  - \* Water Coolant Systems
  - \* Flowgauge and Flowmeter Regulators (No Labor)
  - \* HF Units
  - \* Running Gear/Trailers
  - \* Plasma Cutting Torches
  - \* Remote Controls
  - \* Replacement Parts (No labor)
  - \* Accessories
  - \* Field Options

(NOTE: Field options are covered for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. Engines, batteries and tires are warranted separately by the manufacturer.

Hobart's 5/3/1 Limited Warranty shall not apply to:

1. **Consumable components such as contact tips, cutting nozzles, slip rings, drive rolls, gas diffusers, plasma torch tips and electrodes, weld cables, and tongs and tips, or parts that fail due to normal wear.**
2. Items furnished by Hobart/Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Hobart/Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

HOBART PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Hobart's/Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Hobart/Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Hobart/Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Hobart's/Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Hobart/Miller authorized service facility as determined by Hobart/Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL HOBART/MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY HOBART/MILLER IS EXCLUDED AND DISCLAIMED BY Hobart/Miller.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.

hobart retail 6/02





# Owner's Record

Please complete and retain with your personal records.

Model Name

Serial/Style Number

Purchase Date

(Date which equipment was delivered to original customer.)

Distributor

Address

City

State

Zip



# Resources Available

Always provide Model Name and Serial/Style Number.

## To locate a Distributor, retail or service location:

Call 1-877-Hobart1 or visit our website at  
[www.HobartWelders.com](http://www.HobartWelders.com)

## For technical assistance:

Call 1-800-332-3281

## Contact your Distributor for:

Welding Supplies and Consumables

Options and Accessories

Personal Safety Equipment

Service and Repair

Replacement Parts

Training (Schools, Videos, Books)

Technical Manuals (Servicing Information  
and Parts)

Circuit Diagrams

Welding Process Handbooks

Contact the Delivering Carrier to:

File a claim for loss or damage during  
shipment.

For assistance in filing or settling claims, contact  
your distributor and/or equipment manufacturer's  
Transportation Department.

## Hobart Welding Products

An Illinois Tool Works Company  
600 West Main Street  
Troy, OH 45373 USA

## For Technical Assistance:

Call 1-800-332-3281

For Literature Or Nearest Dealer:  
Call 1-877-Hobart1